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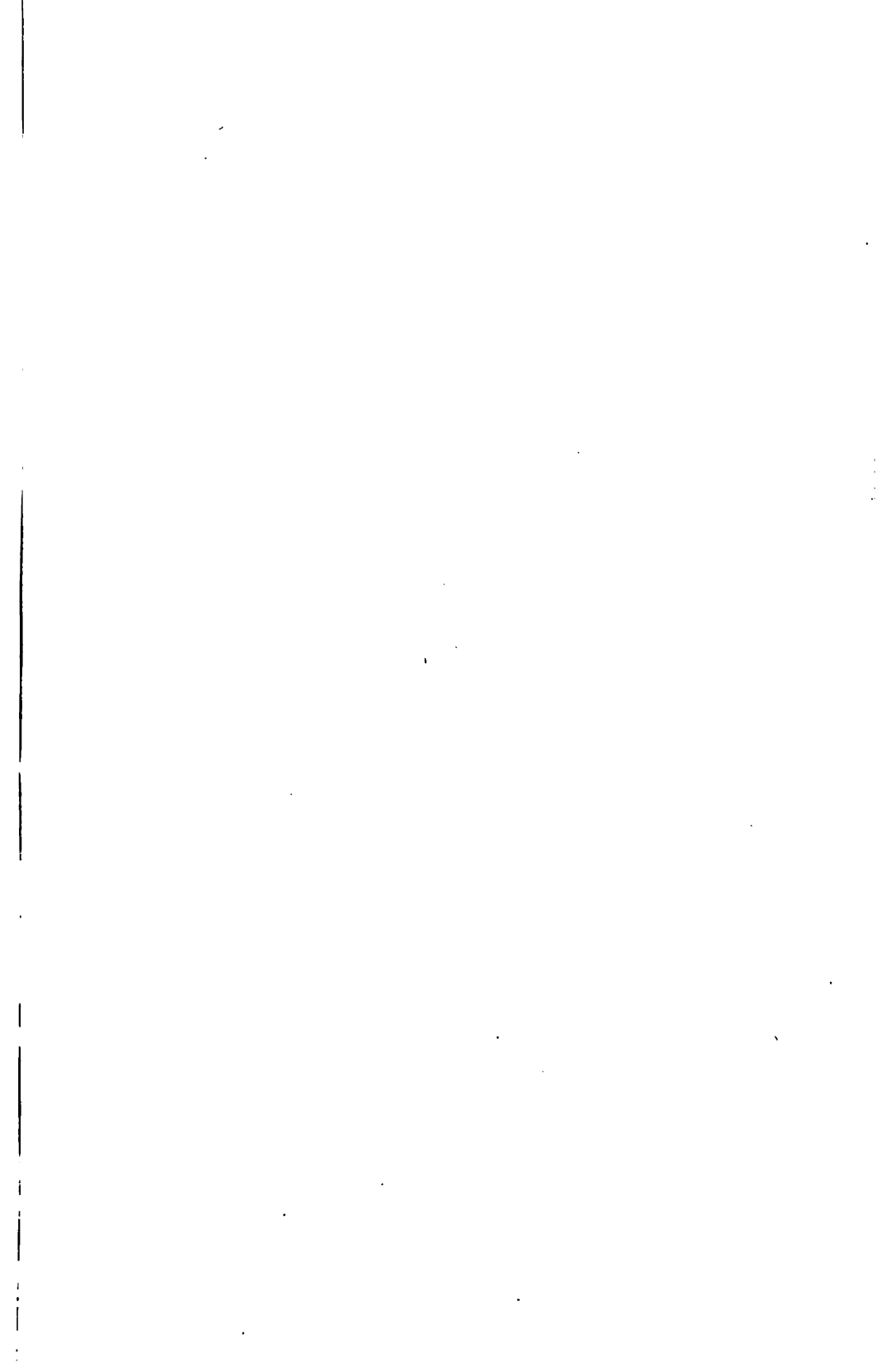
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*Chas O. Cortman, M.D.*

# PROCEEDINGS

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1898



*Albion*

PROCEEDINGS  
OF THE  
AMERICAN \_\_\_\_\_  
C1872  
PHARMACEUTICAL ASSOCIATION

AT THE  
FORTY-FOURTH ANNUAL MEETING,

HELD AT  
MONTREAL, CANADA, AUGUST, 1896.

ALSO THE  
CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.

BALTIMORE:  
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.  
1896.





# American Pharmaceutical Association.

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## Section on Scientific Papers.

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*January, 1897.*

DEAR SIR: The accompanying list of queries which the Committee on Scientific Papers beg to bring to your notice comprises only a few of the numerous subjects of interest to pharmacists. We ask you to examine it and select from it the particular query that may best suit your inclination. Be, however, not confined in your choice to the few subjects here presented, but follow your own desires and proclivities in determining the special line of work that you will pursue in the interest of the American Pharmaceutical Association and the pharmaceutical profession.

We call attention to the Centennial Fund, created for the purpose of encouraging investigation by defraying the expenses of such work. (See By-Laws of the Council, Chap. VII., page xx., Vol. 44, Proc. 1896.) By applying to the General Secretary, Mr. Chas. Caspari, Jr., Baltimore, Md., you can avail yourself of the fund.

It is desired that all manuscripts should reach one of the members of the Committee not later than July 1st, in order to have them printed in time for the meeting at Lake Minnetonka, Minn.

Committee on Scientific Papers,

WILLIAM C. ALPERS, *Chairman,*

The Merck Pharmacy, University Place, N. Y.

VIRGIL COBLENTZ, PH. D., *Secretary,*

College of Pharmacy, W. 68th st., N. Y.

W. L. SCOVILLE, *Associate,*

College of Pharmacy, Boston, Mass.

## LIST OF QUERIES.

1. A comparative examination of the various methods for solutions of formaldehyde is desirable.
2. Is mercuric chloride formed in tablets of calomel on standing? Examine (quantitatively) various commercial samples.
3. Does the addition of linalool acetate to oil of bergamot exert any uniform influence on the results of assay?
4. A convenient method of assay for oil of cinnamon is desirable; it is claimed that the "sulphite" method is unsatisfactory.
5. What is the alkaloidal strength of the various specimens of "Norwood's Tincture" found in the market?
6. Comparative assays of the various commercial brands of iodoform and sublimate gauze are desirable.
7. To what extent is powdered acacia adulterated with dextrine?
8. Commercial litharge is grossly adulterated; what are the adulterants, and in what proportion are they present?
9. An inquiry into the nature and composition of "Morhuol" is desired.
10. *Witch-hazel Water*. Is it desirable to make witch-hazel water (generally termed witch-hazel extract) official? Does it contain formalin? What percentage of alcohol should it contain?
11. Under what conditions can the diastasic power of malt preparations be preserved?
12. Is the use of suppository machines advisable for general prescription work?
13. A process for a fluid extract of wild cherry miscible with water is desired.
14. What is the character and quantity of fixed oil in *pareira brava*?
15. It has been stated that samples of potassium acetate have an alliaceous odor. To what is that due?
16. What is the influence of a low temperature in percolation?
17. Would it be practical or advisable for pharmacists to undertake the dispensing of a sterilized and adapted (humanized) milk for infants? What process would be most advisable for this?
18. Is glucose or grape sugar of any value as a preservative in syrups of hydriodic acid and syrup of ferrous iodide?
19. What is the influence of filtration on solutions?
20. Salol is often ordered in powdered form. How can pure powdered salol be easily prepared?
21. Rubber substitutes. It is claimed that articles under this name are largely used by manufacturers as admixtures to Para rubber, being prepared of sulphur or chloride of sulphur and vegetable or animal oils, glycerin and turpentine. Investigation invited.

22. Acetone alcohol. An article under this name has been introduced as a substitute for ethyl alcohol. What is it, and how is it made ?

23. It is claimed that the deep green color of some extracts and fluid extracts in the market is traceable to copper vessels used in their manufacture. Investigation invited.

24. Precipitated sulphur seems to be grossly adulterated. Is it possible to obtain it pure in the open market ?

25. To what extent is selenium found in "flowers of sulphur ?"



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<i>New York.</i>	Geo. J. Seabury, New York.	<i>West Virginia.</i>	Edwin L. Boggs, Charleston.
<i>North Carolina.</i>	John Y. MacRae, Raleigh.	<i>Wisconsin.</i>	R. A. Sauerhering, Mayville.
<i>North Dakota.</i>	H. L. Haussamen, Grafton.	<i>Wyoming.</i>	Leopold L. Daus, Rock Springs.
<i>Ohio.</i>	John U. Lloyd, Cincinnati.		

## COMMITTEE ON NATIONAL FORMULARY.

C. LEWIS DIEHL (Chairman).....	Louisville, Ky.
C. S. N. HALLBERG, Chicago.	C. T. P. FENNEL, Cincinnati, O.
G. H. C. KLE, St. Louis, Mo.	ADAM CONRATH, Milwaukee, Wis.
And the following representatives of State	(or District) Pharmaceutical Associations.
<i>Alabama.</i> Philip C. Candidus, Mobile.	<i>Mississippi.</i> Jas. A. Shell, Aberdeen.
<i>Arkansas.</i> John B. Bond, Little Rock.	<i>Missouri.</i> J. M. Love, Kansas City.
<i>California.</i> Val. Schmidt, San Francisco.	<i>Nebraska.</i> Norman A. Kuhn, Omaha.
<i>Colorado.</i> Chas. M. Ford, Denver.	<i>New Hampshire.</i>
<i>Columbia, Dist.</i> Samuel L. Hilton, Wash- ington.	<i>New Jersey.</i> Chas. B. Smith, Newark.
<i>Connecticut.</i> Chas. A. Rapelye, Hartford.	<i>New York.</i> Geo. B. Wray, Yonkers.
<i>Delaware.</i> F. R. Smith, Wilmington.	<i>North Carolina.</i> E. V. Zoeller, Tarboro.
<i>Florida.</i> J. M. Dixon, Titusville.	<i>North Dakota.</i> E. C. Maxey, Fargo.
<i>Georgia.</i> Geo. D. Case, Milledgeville.	<i>Ohio.</i> J. A. Nipgen, Chillicothe.
<i>Illinois.</i> R. E. Rhode, Chicago.	<i>Oregon.</i> H. Dixon Dietrich, Portland.
<i>Indiana.</i> G. W. Sloan, Indianapolis.	<i>Pennsylvania.</i> Chas. T. George, Harrisburg.
<i>Iowa.</i> Geo. H. Schafer, Fort Madi- son.	<i>Rhode Island.</i>
<i>Kansas.</i> Lucius E. Sayre, Lawrence.	<i>South Carolina.</i> Chas. F. Panknin, Charleston.
<i>Kentucky.</i>	<i>South Dakota.</i> G. W. Lowry, Sioux Falls.
<i>Louisiana.</i> R. N. Girling, New Orleans.	<i>Tennessee.</i> James O. Burge, Nashville.
<i>Maine.</i> N. S. Harlow, Bangor.	<i>Texas.</i> E. M. Wells, Fort Worth.
<i>Maryland.</i> Chas. Caspari, Jr., Baltimore.	<i>Virginia.</i>
<i>Massachusetts.</i> Wm. W. Bartlet, Boston.	<i>Washington.</i> Henry E. Holmes, Seattle.
<i>Michigan.</i> A. B. Stevens, Ann Arbor.	<i>West Virginia.</i> Edwin L. Boggs, Charleston.
<i>Minnesota.</i> F. F. Stark, Minneapolis.	<i>Wisconsin.</i> A. Conrath, Milwaukee.
	<i>Province of Quebec, Can.</i> Henry R. Gray Montreal.

## LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice Presidents.
Oct. 6, 1852..	Philadelphia, Pa. ....	<i>Daniel B. Smith</i> , Philadelphia.	<i>George W. Andrews</i> , Baltimore.	<i>Samuel M. Colcord</i> , Boston.	<i>C. Augustus Smith</i> , Cincinnati.
Aug. 24, 1853..	Boston, Mass. ....	<i>William A. Brewer</i> , Boston.	<i>George D. Coggeshall</i> , New York.	<i>Alexander Daval</i> , Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854..	Cincinnati, O. ....	<i>William B. Chapman</i> , Cincinnati.	Henry T. Cummings, Portland, Me.	<i>John Meakin</i> , New York.	<i>Joseph Latley</i> , Richmond, Va.
Sept. 11, 1855..	New York, N. Y. ....	<i>John Meakin</i> , New York.	Charles B. Guthrie, Memphis, Tenn.	<i>Charles Ellis</i> , Philadelphia.	<i>Henry F. Fish</i> , Waterbury, Conn.
Sept. 9, 1856..	Baltimore, Md. ....	<i>George W. Andrews</i> , Baltimore.	<i>John L. Kidwell</i> , Washington, D. C.	Frederick Stearns, Detroit, Mich.	<i>Henry T. Kiersted</i> , New York, N. Y.
Sept. 8, 1857..	Philadelphia, Pa. ....	<i>Charles Ellis</i> , Philadelphia.	<i>James Cooke</i> , Fredericksburg, Va.	<i>Samuel P. Peck</i> , Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858..	Washington, D. C. ...	<i>John L. Kidwell</i> , Georgetown, D. C.	Edward R. Squibb, Brooklyn, N. Y.	<i>James O' Gallagher</i> , St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859..	Boston, Mass. ....	<i>Samuel M. Colcord</i> , Boston.	<i>William Procter, Jr.</i> , Philadelphia.	<i>Joseph Roberts</i> , Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860..	New York, N. Y. ....	<i>Henry T. Kiersted</i> , New York.	William J. M. Gordon, Cincinnati.	<i>William S. Thompson</i> , Baltimore.	<i>Theodore Metcalf</i> , Boston.
Aug. 27, 1862..	Philadelphia, Pa. ....	<i>William Procter, Jr.</i> , Philadelphia.	<i>John Milhan</i> , New York.	<i>Eugene L. Massol</i> , St. Louis.	<i>J. Faris Moore</i> , Baltimore.
Sept. 8, 1863..	Baltimore, Md. ....	<i>J. Faris Moore</i> , Baltimore.	<i>John M. Maisch</i> , Philadelphia.	Chas. A. Tufts, Dover, N. H.	<i>George W. Weyman</i> , Pittsburgh.
Sept. 21, 1864..	Cincinnati, O. ....	William J. M. Gordon, Cincinnati.	<i>Richard H. Stabler</i> , Alexandria, Va.	Enno Sander, St. Louis.	<i>Thomas Hollis</i> , Boston.

## LIST OF OFFICERS (Continued).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 5, 1865..	Boston, Mass. ....	<i>Henry W. Lincoln</i> , Boston.	<i>George C. Clote</i> , Brooklyn, N. Y.	<i>Elijah W. Sackrider</i> , Cleveland, O.	Charles A. Heinisch, Lancaster, Pa.
Aug. 22, 1866..	Detroit, Mich. ....	Frederick Stearns, Detroit, Mich.	<i>Edward Parrish</i> , Philadelphia.	Ezekiel H. Sargent, Chicago.	<i>John W. Shelden</i> , New York.
Sept. 10, 1867..	New York, N. Y. ....	<i>John Milhau</i> , New York.	Robert J. Brown, Leavenworth, Kan.	<i>A. Hynson Jennings</i> , Baltimore.	<i>Daniel Henchman</i> , Boston.
Sept. 8, 1868..	Philadelphia, Pa. ....	<i>Edward Parrish</i> , Philadelphia.	<i>Ferris Brighthouse</i> , Wilmington, Del.	<i>Edward S. Wayne</i> , Cincinnati.	Albert E. Ebert, Chicago.
Sept. 7, 1869..	Chicago, Ill. ....	Ezekiel H. Sargent, Chicago.	Ferdinand W. Sennewald, St. Louis.	<i>John H. Pope</i> , New Orleans.	Joel S. Orne, Cambridgeport, Mass.
Sept. 13, 1870..	Baltimore, Md. ....	<i>Richard H. Stabler</i> , Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	<i>Eugene L. Massot</i> , St. Louis.
Sept. 12, 1871..	St. Louis, Mo. ....	Enno Sander, St. Louis.	C. Lewis Diehl, Louisville, Ky.	<i>George F. H. Markoe</i> , Boston.	<i>Matthew F. Ash</i> , Jackson, Miss.
Sept. 3, 1872..	Cleveland, O. ....	Albert E. Ebert, Chicago.	<i>Samuel S. Garrigue</i> , East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	<i>Henry C. Gaylord</i> , Cleveland, O.
Sept. 16, 1873..	Richmond, Va. ....	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	<i>Paul Balluff</i> , New York.
Sept. 8, 1874..	Louisville, Ky. ....	C. Lewis Diehl, Louisville, Ky.	<i>Joseph Roberts</i> , Baltimore.	William T. Wenzell, San Francisco.	Augustus R. Bayley, Cambridgeport, Mass.
Sept. 7, 1875..	Boston, Mass. ....	<i>George F. H. Markoe</i> , Boston.	Frederick Hoffmann, New York.	T. Roberts Baker, Richmond, Va.	Christian F. G. Meyer, St. Louis.
Sept. 12, 1876..	Philadelphia, Pa. ....	Charles Bullock, Philadelphia.	Samuel A. D. Sheppard, Boston.	<i>Gustavus J. Luhn</i> , Charleston, S. C.	<i>Jacob D. Wells</i> , Cincinnati.
Sept. 4, 1877..	Toronto, Can. ....	William Saunders, London, Ont.	Ewen McIntyre, New York.	John Ingalls, Macon, Ga.	<i>Emile Painter</i> , San Francisco.

## LIST OF OFFICERS (Continued).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Nov. 26, 1878..	Atlanta, Ga. ....	<i>Gastatus J. Lusk</i> , Charleston, S. C.	<i>Frederick T. Whiting</i> , Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	<i>William H. Crawford</i> , St. Louis.
Sept. 9, 1879..	Indianapolis, Ind. ....	George W. Sloan, Indianapolis, Ind.	T. Roberts Baker, Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	Philip C. Candidus, Mobile, Ala.
Sept. 14, 1880..	Saratoga, N. Y. ....	James T. Shinn, Philadelphia.	George H. Schafer, Fort Madison, Ia.	William S. Thompson, Washington, D. C.	William Simpson, Raleigh, N. C.
Aug. 23, 1881..	Kansas City, Mo. ....	<i>P. Wendover Bedford</i> , New York.	<i>Emlen Painter</i> , San Francisco.	George Leis, Lawrence, Kan.	<i>John F. Judge</i> , Cincinnati.
Sept. 12, 1882..	Niagara Falls, N. Y. ....	Charles A. Heinitch, Lancaster, Pa.	John Ingalls, Macon, Ga.	Louis Dohme, Baltimore.	<i>William B. Blandine</i> , Providence, R. I.
Sept. 11, 1883..	Washington, D. C. ....	William S. Thompson, Washington, D. C.	Charles Rice, New York.	<i>Frederick H. Masi</i> , Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884..	Milwaukee, Wis. ....	John Ingalls, Macon, Ga.	<i>John A. Dadd</i> , Milwaukee, Wis.	Henry Canning, Boston, Mass.	<i>Charles F. Goodman</i> , Omaha, Neb.
Sept. 8, 1885..	Pittsburgh, Pa. ....	<i>Joseph Roberts</i> , Baltimore, Md.	Albert H. Hollister, Madison, Wis.	Albert B. Prescott, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886..	Providence, R. I. ....	Chas. A. Tufts, Dover, N. H.	<i>Henry J. Menninger</i> , Brooklyn, N. Y.	M. W. Alexander, St. Louis, Mo.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887..	Cincinnati, O. ....	John U. Lloyd, Cincinnati, O.	M. W. Alexander, St. Louis, Mo.	A. K. Finlay, New Orleans, La.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888..	Detroit, Mich. ....	M. W. Alexander, St. Louis, Mo.	Jas. Vernon, Detroit, Mich.	Fred. Wilcox, Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889..	San Francisco, Cal. ....	<i>Emlen Painter</i> , New York.	Karl Simmon, St. Paul, Minn.	Wm. M. Searby, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890..	Old Pt. Comfort, Va. ....	A. B. Taylor, Philadelphia.	A. B. Stevens, Ann Arbor, Mich.	Chas. E. Dohme, Baltimore, Md.	Jas. M. Good, St. Louis, Mo.

## LIST OF OFFICERS (Concluded).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
April 27, 1891...	New Orleans, La. ....	A. K. Finlay, New Orleans, La.	Geo. J. Seabury, New York, N. Y.	W. H. Torbert, Dubuque, Ia.	L. T. Dunning, Sioux Falls, S. Dak.
July 14, 1892...	Profile House, N. H.	Jos. P. Remington, Philadelphia.	A. P. Preston, Portsmouth, N. H.	Sidney P. Watson, Atlanta, Ga.	Wm. H. Averill, Frankfort, Ky.
Aug. 14, 1893...	Chicago, Ill. ....	Edgar L. Patch, Boston.	Leo Eliel, South Bend, Ind.	Wiley Rogers, Louisville, Ky.	Chas. Caspari, Jr., Baltimore, Md.
Sept. 3, 1894...	Asheville, N. C. ....	William Simpson, Raleigh, N. C.	Chas. M. Ford, Denver, Colo.	Jno. N. Hurty, Indianapolis, Ind.	Jos. E. Morrison, Montreal, Can.
Aug. 14, 1895...	Denver, Colo. ....	James M. Good, St. Louis, Mo.	Chas. E. Dohme, Baltimore, Md.	Adolph Brandenberger, Jefferson City, Mo.	Mrs. M. O. Miner, Hiawatha, Kans.
Aug. 12, 1896...	Montreal, Can. ....	Joseph E. Morrison, Montreal Can.	Geo. F. Payne, Atlanta, Ga.	Wm. A. Frost, St. Paul, Minn.	Geo. W. Parisen, Perth Amboy, N. J.

## TREASURERS.

Alfred B. Taylor, Philadelphia, 1852-54.  
*Samuel M. Colcord*, Boston, 1854-56, and  
 1857-59.

*James S. Aspinwall*, New York, 1856-57.  
*Ashel Boyden*, Boston, 1859-60.  
 Henry Haviland, New York, 1860-63.

## RECORDING SECRETARIES.

*George D. Coggeshall*, New York, 1852-53.  
*Edward Parrish*, Philadelphia, 1853-54.  
*Edward S. Wayne*, Cincinnati, 1854-55.  
 William J. M. Gordon, Cincinnati, 1855-59.

Charles Bullock, Philadelphia, 1859-60.  
 James T. Shinn, Philadelphia, 1860-62.  
*Peter W. Bedford*, New York, 1862-63.

William Evans, Jr., Philadelphia, 1863-64.  
 Henry N. Rittenhouse, Philadelphia, 1864-65.  
 H. M. Whelpley, St. Louis, 1893.

## CORRESPONDING SECRETARIES.

*William Procter, Jr.*, 1852-53, and  
 1854-57.  
*William B. Chapman*, Cincinnati, 1853-54.

*Edward Parrish*, Philadelphia, 1857-58.  
*Ambrose Smith*, Philadelphia, 1858-59.  
*William Hegeman*, New York, 1859-60.

*Peter W. Bedford*, New York, 1860-62, and 1863-65.  
*John M. Maish*, Philadelphia, 1862-63.



## PERMANENT SECRETARIES.

*John M. Maisch*, Philadelphia, 1865-Sept., 1893.

*Henry M. Whelpley*, St. Louis (acting), August, 1893.

*Joseph P. Remington*, Philadelphia, 1893-94.  
*Chas. Caspari, Jr.*, Baltimore, 1894-96.

## GENERAL SECRETARY.

*Chas. Caspari, Jr.*, Baltimore, 1896-97.

## LOCAL SECRETARIES.

For the meeting held in

1867.....*P. Wendover Bedford*.  
1868.....*Alfred B. Taylor*.  
1869.....*Henry W. Fuller*.  
1870.....*J. Faris Moore*.  
1871.....*William H. Crawford*.  
1872.....*Henry C. Gaylord*.  
1873.....*Thomas H. Hazard*.  
1874.....*Emil Scheffer*.  
1875.....*Samuel A. D. Sheppard*.  
1876.....*Adolphus W. Miller*.  
1877.....*Henry J. Rose*.

For the meeting held in

1878.....*Jesse W. Rankin*.  
1879.....*Eli Lilly*.  
1880.....*Charles F. Fish*.  
1881.....*William T. Ford*.  
1882.....*Hiram E. Griffith*.  
1883.....*Charles Becker*.  
1884.....*Henry C. Schranck*.  
1885.....*George A. Kelly*.  
1886.....*William B. Blanding*.  
1887.....*George W. Voss*.

For the meeting held in

1888.....*James Vernon*.  
1889.....*Edward W. Runyon*.  
1890.....*Charles E. Dohme*.  
1891.....*A. K. Finlay*.  
1892.....*H. M. Whitney*.  
1893.....*Henry Bieth*.  
1894.....*W. G. Smith*.  
1895.....*Edm. L. Scholtz*.  
1896.....*Joseph E. Morrison*.  
1897.....*Edw. Shumpik*.

## REPORTERS ON PROGRESS OF PHARMACY.

*Chas. Rice*, New York, N. Y., 1891-92.

*Henry Kraemer*, New York, N. Y., 1892-95.

## OFFICERS OF THE COUNCIL SINCE ITS FIRST ORGANIZATION.

## Chairman.

1880-81.....*Jos. P. Remington*.  
1881-82....." "  
1882-83....." "  
1883-84....." "  
1884-85....." "  
1885-86....." "  
1886-87.....*Wm. S. Thompson*.  
1887-88.....*Wm. H. Rogers*.  
1888-89.....*Jas. M. Good*.

## Vice-Chairman.

*Joseph Roberts*.  
*Wm. J. M. Gordon*.  
" "  
*C. Lewis Diehl*.  
*John A. Dadd*.  
*C. Lewis Diehl*.  
*H. J. Menninger*.  
*Karl Simmon*.  
*Emlen Painter*.

## Secretary.

*Geo. W. Kennedy*.  
" "  
" "  
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" "

1889-90 .....	Jas. M. Good.	Wm. S. Thompson.	Geo. W. Kennedy.
1890-91 .....	" "	" "	" "
1891-92 .....	" "	" "	" "
1892-93 .....	" "	H. M. Whitney.	" "
1893-94 .....	" "	" "	" "
1894-95 .....	Wm. S. Thompson.	" "	" "
1895-96 .....	" "	Wm. C. Alpers.	" "
1896-97 .....	" "	Jas. M. Good.	" "
PAST AND PRESENT OFFICERS OF THE SECTIONS.			
SECTION ON COMMERCIAL INTERESTS.		SECTION ON SCIENTIFIC PAPERS.— <i>Com.</i>	
<i>Chairman.</i>		1895-96 .....	W. C. Alpers.
1887-88 .....	A. H. Hollister.	1896-97 .....	V. Coblenz.
1888-89 .....	" "	SECTION ON PHARMACEUTICAL EDUCATION.	
1889-90 .....	Leo Eliel.	<i>Chairman.</i>	
1890-91 .....	Henry Canning.	1887-88 .....	H. M. Whelpley.
1891-92 .....	W. H. Torbert.	1888-89 .....	L. E. Sayre.
1892-93 .....	" "	SECTION ON PHARMACEUTICAL LEGISLATION.	
1893-94 .....	Wiley Rogers.	<i>Chairman.</i>	
1894-95 .....	Geo. J. Seabury.	1887-88 .....	W. P. De Forest.
1895-96 .....	" "	1888-89 .....	J. N. Hurty.
1896-97 .....	Lewis C. Hopp.	SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.	
SECTION ON SCIENTIFIC PAPERS.		<i>Chairman.</i>	
<i>Secretary.</i>		1889-90 .....	A. B. Stevens.
1887-88 .....	A. B. Lyons.	1890-91 .....	L. C. Hogan.
1888-89 .....	H. M. Whelpley.	1891-92 .....	" "
1889-90 .....	C. F. Dare.	1892-93 .....	" "
1890-91 .....	C. S. N. Hallberg.	1893-94 .....	" "
1891-92 .....	H. W. Snow.	1894-95 .....	C. S. N. Hallberg.
1892-93 .....	F. G. Ryan.	1895-96 .....	Jas. H. Beal.
1893-94 .....	C. M. Ford.	1896-97 .....	" "
1894-95 .....	Geo. B. Kauffman.		

## AUTHORIZED AGENTS ON THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President in compliance with the following resolutions:

*Resolved*, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

*Resolved*, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

*Resolved*, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

<i>Alabama,</i>	Chas. A. Mohr, 931 Dauphin St.,	Mobile.
<i>Arizona,</i>	Clemens L. Eschman, Washington & Centre Sts.,	Phoenix.
<i>Arkansas,</i>	John B. Bond, Main and Fifth streets,	Little Rock.
	William L. Dewoody,	Pine Bluff.
<i>California,</i>	William T. Wenzell, 322 Polk street,	San Francisco.
	George B. Flint, 1101 Broadway,	Oakland.
<i>Colorado,</i>	Edmund L. Scholtz, Sixteenth & Stout streets,	Denver.
<i>Dist. of Columbia,</i>	Walter G. Duckett, 22d st. and Penna. ave.,	Washington.
<i>Connecticut,</i>	John K. Williams, 391 Main street,	Hartford.
	Warren A. Spalding, 19 Church street,	New Haven.
<i>Delaware,</i>	John M. Harvey, 407 Delaware ave.,	Wilmington.
<i>Florida,</i>	William Aird, Maggie & E. Brough streets,	Jacksonville.
	Sydney B. Leonardi, Franklin st.,	Tampa.
<i>Georgia,</i>	John P. Turner, 1002 Broad St.,	Columbus.
	Robert H. Land, 812 Broad street,	Augusta.
	John Ingalls, Fourth and Poplar streets,	Macon.
	Sidney P. Watson, 137 Richardson street,	Atlanta.
<i>Idaho,</i>	David E. Smithson,	{ Caldwell, Can-
		{ yon Co.
<i>Illinois,</i>	David G. Plummer, 6 Main street,	Bradford.
	C. S. N. Hallberg, 358 Dearborn street,	Chicago.
	Charles Zimmerman, 423 S. Adams street,	Peoria.

<i>Indiana,</i>	Henry J. Schlaepfer, Second and Main streets, George W. Sloan, 22 W. Washington street, Jacob Baur, 701 Wabash avenue,	Evansville. Indianapolis. Terre Haute.
<i>Indian Territory.</i>	Chas. G. Moore,	Eufaula.
<i>Iowa,</i>	John W. Ballard, 106 West Second street, Wm. O. Kaiser, 904 6th ave., Theodore W. Ruete, 568 Main street, George H. Schafer, 713 Front street, Silas H. Moore, 525 Fourth street,	Davenport. Des Moines. Dubuque. Fort Madison. Sioux City.
<i>Kansas,</i>	George Leis, 747 Massachusetts street, Robert J. Brown, 113 Delaware street,	Lawrence. Leavenworth.
<i>Kentucky,</i>	George A. Zwick, Eleventh st. and Madison ave., William H. Averill, 435 Main street, C. Lewis Diehl, Third street and Broadway,	Covington. Frankfort. Louisville.
<i>Louisiana,</i>	Alexander K. Finlay, 186 Camp street,	New Orleans.
<i>Maine,</i>	Noah S. Harlow, 4 Smith's Block, Edward A. Hay, Free and Middle sts.,	Bangor. Portland.
<i>Maryland,</i>	D. M. R. Culbreth, 203 E. Preston street, Thomas W. Shryer, 111 Baltimore street,	Baltimore. Cumberland.
<i>Massachusetts,</i>	S. A. D. Sheppard, 1129 Washington street, Joel S. Orne, 493 Main street, B. Frank Stacey, Thompson Square, Freeman H. Butler, 141 Central street, James E. Blake, 64 North Second street, John H. Manning, 51 North street, Joseph J. Estes, Union and Church streets, Thomas B. Nichols, 178 Essex street, Francis M. Harris, 814 Main street, Ottmar Eberbach, 12 South Main street, James Vernor, 235 Woodward avenue, Jacob Jesson, Western avenue and Jefferson st.,	Boston. Cambridgeport. Charlestown. Lowell. New Bedford. Pittsfield. Rockland. Salem. Worcester. Ann Arbor. Detroit. Muskegon.
<i>Michigan,</i>	Wm. A. Frost, Selby and Western aves. Ed. Shumpik, 1921 N. Washington ave.,	St. Paul. Minneapolis.
<i>Minnesota,</i>	Joseph W. Eckford, Commerce street, James M. Good, 2348 Olive street, George Eyssell, 1036 Union ave.,	Aberdeen. St. Louis. Kansas City.
<i>Mississippi,</i>	Autumn V. Pease,	Fairbury.
<i>Missouri,</i>	William A. Perkins, 84 South C street, Francis C. Miville, 1023 Elm street, Nelson S. Whitman, 175 Main street, Andrew P. Preston, 2 Congress Block, Wm. M. Oliver, 132 Broad street, Hermann Klussmann, Fourth st. & Lafayette ave., Maxwell Abernethy, 188 Newark avenue, Charles B. Smith, 861 Broad street, Howard P. Reynolds, Park and North avenues, Charles H. Gaus, 202 Washington avenue, Henry W. Schimpf, 365 Franklin ave., Charles O. Rano, 1872 Niagara street, William L. Du Bois, 281 Main street, John Hepburn, 103 Main street, Harvey G. Goodale, P. O. Box 29,	Virginia City. Manchester. Nashua. Portsmouth. Elizabeth. Hoboken. Jersey City. Newark. Plainfield. Albany. Brooklyn. Buffalo. Catskill. Flushing. Jamaica.
<i>Nebraska,</i>		
<i>Nevada,</i>		
<i>New Hampshire,</i>		
<i>New Jersey,</i>		
<i>New York,</i>		

<i>New York,</i>	James T. King, Main and South streets, John McKesson, Jr., 91 Fulton street, Joseph M. Schmitt, 312 North street, James A. Owens, 45 Dominick street. Charles F. Fish, 348 Broadway, Charles W. Snow, 214 Warren street, William Blaikie, 202 Genesee street,	Middletown. New York. Rochester. Rome. Saratoga. Syracuse. Utica.
<i>North Carolina,</i>	William Simpson, 101 Fayetteville street, John H. Hardin, 124 South Front street,	Raleigh. Wilmington.
<i>North Dakota,</i>	Henry L. Haussamen,	Grafton.
<i>Ohio,</i>	J. U. Lloyd, Court and Plum streets, George L. Hechler, 1099 Broadway, Charles Huston, 47 South High street, Henry F. Kurfurst, 502 Xenia avenue, Thomas J. Casper, 41 East Main street,	Cincinnati. Cleveland. Columbus. Dayton. Springfield.
<i>Oregon,</i>	Louis Blumauer, Fourth and Morrison streets,	Portland.
<i>Pennsylvania,</i>	Jacob A. Miller, Second and Chestnut streets, Charles A. Heinitsch, 16 East King street, Joseph L. Lemberger, 5 North Ninth street, Richard M. Shoemaker, Fourth and Race streets, George A. Kelly, 101 Wood street, Philip M. Ziegler, 526 Penn street, Edward A. Cornell, Fourth and Pine streets,	Harrisburg. Lancaster. Lebanon. Philadelphia. Pittsburg. Reading. Williamsport.
<i>Rhode Island,</i>	Wm. H. Cotton, 226 Thames street, Wm. K. Reynolds, 354 Friendship street,	Newport. Providence.
<i>South Carolina,</i>	Edward S. Burnham, 369 King street, Oscar E. Thomas, 164 Main street,	Charleston. Columbia.
<i>Tennessee,</i>	Jas. S. Robinson, Second and Madison streets, C. J. Gooding, 135 Gay St., James O. Burge, Church and High streets,	Memphis. Knoxville. Nashville.
<i>Texas,</i>	Geo. J. F. Schmitt, 507 W. Commerce street,	San Antonio.
<i>Utah,</i>	Frank A. Druehl, Main and 3d South streets,	Salt Lake City.
<i>Vermont,</i>	Geo. A. Crossman, 2 Simonds Block,	Brandon.
<i>Virginia,</i>	T. Roberts Baker, 919 East Main street,	Richmond.
<i>Washington,</i>	Henry E. Holmes,	Seattle.
<i>West Virginia,</i>	Edwin L. Boggs, Kanawha Bank Building,	Charleston.
<i>Wisconsin,</i>	Edward Kremers, 435 Park street, John R. Drake, 365 East Water street,	Madison. Milwaukee.
<i>Wyoming,</i>	Emanuel Stuver,	Rawlins.
<i>Prov. Nova Scotia,</i>	William A. Simson, Pentagon Bldg.,	Halifax.
<i>Prov. Ontario,</i>	John Lowden, 53 Colborne street,	Toronto.
<i>Prov. Quebec,</i>	Henry R. Gray, 122 St. Lawrence Main street,	Montreal.

## THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

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At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are three permanent Funds at the present time, all of which are invested in government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

### THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II., Section 7 (afterwards Section 8), contained the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87-96), and is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the annual interest of which only shall be used by the Association for its current expenses.*"

Chapter VI., Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) and again in 1896 (Proceedings, page 17) so as to apply also to those who have been members for over twenty years (see Chapter VII., Article 4 of By-Laws). Under this clause the life membership (new style) of the present roll is sixty, as published in the Proceedings.

The Treasurer's report for 1880 (page 524) states the life membership fund to be \$75, for 1881 (p. 513) \$613, for 1882 (p. 608) \$685, for 1883 (p. 436) \$904.38, and for 1884

(p. 524) \$944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that \$316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147), it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of \$3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471), the Association ordered again a transfer to the same fund of \$4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the Life Membership Fund is invested. The report published on page 48 of the present volume shows that on July 1st, 1896, the value of the Life Membership Fund was \$10,321.90 (face value of securities only given), of which sum *the annual interest only shall be used by the Association for its current expenses.*

#### THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products: the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize*.

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler; for 1890, to Wm. T. Wenzell; and for 1891, to John U. Lloyd.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to \$683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On July 1st, 1896 (Proceedings, p. 47), its reported value was \$730.12 (face value of securities only given). The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

#### THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to \$525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science

connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526, 528), and adopted the name *Centennial Fund*.

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when \$582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII. (Proceedings 1881, pp. 190, 549). Members have not availed themselves of this Fund to the extent contemplated at its foundation; for the amounts paid out have been only \$7.50 to Rob. B. Warder for material used for investigations reported in 1885; \$96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16); and \$32 to Edward Kremers for material necessary for the prosecution of scientific research on the menthol group, reported in the Proceedings for 1892, \$50 to the same investigator in 1893, and \$50 again to the same investigator in 1894.

The original sum of \$1117.81 (\$525 + 582.81) had increased in 1883 to \$1232.76. Since 1887 the securities in which the Fund is invested are specified in the reports of the Chairman of the Council; the reported value was \$1360.88 (face value of securities only given) on July 1, 1896 (see Proceedings, p. 48). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

#### THE GENERAL FUND.

In October, 1891 (see Proceedings 1892, page 13), the Council instructed the Treasurer to draw from the cash on deposit a sufficient sum and purchase therewith three bonds, one thousand dollars each, the same to be such bonds as shall be approved by the Finance Committee, said bonds to be registered in the name of the Treasurer of the American Pharmaceutical Association, and placed in the custody of the Chairman of the Council.

The investment was made in bonds of the American Security and Trust Company at Washington, D. C., for the sum of \$3021.62 (see Proceedings 1892, pages 27 and 28).

#### PRIZES.

The following resolutions were adopted August 15, 1893 (see page 16, Proc. 1893):

*Resolved*, That if worthy papers be presented, the Association award annually three prizes for the three most valuable papers, aggregating the sum of \$150.00, and apportioned as follows: \$75.00 for the first, \$50.00 for the second, and \$25.00 for the third prize.

*Resolved*, That a Committee of three be annually appointed by the President of the Association, their duty to be, first, to decide if one or more of the papers presented are worthy of a prize, and second, to decide upon the relative merits of such papers as are deemed worthy.

*Resolved*, That nothing in these resolutions shall be so construed at any time as to prevent the writer of the Ebert Prize paper from also receiving one of the Association Prizes for said paper.

For names of members of this committee see page v.

The old resolution on Prizes which the above replaces will be found on page 506 of the Proceedings for 1887.



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## PREFATORY NOTICE.

At the forty-second annual meeting of the Association held at Asheville, N. C., the Council determined that the distribution of the printed Minutes, together with the papers read at the meeting, in advance of the bound volume of the Proceedings, which plan had been in operation since 1891, should be discontinued. This action of Council was approved by the Association at large at the General Session held September 8, 1894.

With the view of securing for the Proceedings as wide a distribution as possible, and to enable members to complete their sets at very low figures, the Council, at the forty-third annual meeting held at Denver, Colo., decided that the price of the Proceedings for 1890 and all previous years be reduced to one-half of that heretofore published. The Association at the General Session held on August 20, 1895, approved the action of Council, and the Committee on Publication offer the different issues at the following rates :

	PAPER COVER.	BOUND CLOTH
1851, 1852, 1853, 1854, 1855.....	each \$ .13	\$
1857.....	.20	.25
1858, 1864, 1865 .....	" .38	
1858, 1860, 1862, 1863, 1864, 1865 .....	"	.50
1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873 .....	" .50	.75
1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883.....	" 1.25	1.50
1884, 1885, 1886, 1887 .....	" 1.75	2.00
1888, 1889, 1890 .....	" 2.50	2.75
1891, 1892, 1893 .....	" 5.00	5.50
1894.....	" 6.00	6.50
1895.....	" 5.50	6.00
1896 .....	" 5.00	5.50

The reduced prices on all volumes published prior to 1891 do not include free delivery.

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1858	7	1 40	1 12	1873	20	9 90	5 04	1886	33	30 90	15 30
1860	8	1 90	1 52	1874	21	11 40	6 84	1887	34	32 90	16 15
1862	9	2 40	1 68	1875	22	12 90	7 74	1888	35	35 05	17 26
1863	10	2 50	2 03	1876	23	14 40	7 20	1889	36	38 40	18 36
1864	11	3 40	2 38	1877	24	15 90	7 95	1890	37	41 15	19 46
1865	12	3 90	2 63	1878	25	17 40	8 70	1891	38	46 65	18 66
1866	13	4 65	3 26	1879	26	18 90	9 45	1892	39	52 15	20 86
1867	14	5 40	3 78	1880	27	20 40	10 20	1893	40	57 65	23 06
1868	15	6 15	4 31	1881	28	21 90	10 95	1894	41	64 15	25 66
1869	16	6 90	4 14	1882	29	23 40	11 70	1895	42	70 15	28 06
1870	17	7 65	4 59	1883	30	24 90	12 45	1896	43	75 65	30 26

Orders for Proceedings should be sent to the General Secretary, 109 Aisquith street, Baltimore, Md.

The gold badge of the Association may be procured from the General Secretary on receipt of \$2.



Blank forms of applications and recommendations for membership may be obtained from the General Secretary or from the Committee on Membership; when properly filled up they should be sent to the Secretary of the Committee on Membership, Geo. W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to him in the care of the Local Secretary, Edw. Shumpik, 1921 N. Washington Ave., Minneapolis, Minn.

The forty-fifth annual meeting of the Association will convene at Lake Minnetonka, Minnesota, on the third Monday (23d day) of August, 1897, at 3 o'clock p. m.

MINUTES  
OF THE  
FORTY-FOURTH ANNUAL MEETING.

FIRST SESSION—WEDNESDAY, AUGUST 12TH, 1896.

The forty-fourth annual convention of the American Pharmaceutical Association was called to order at 3.30 p. m., August 12th, 1896, in the Windsor Hotel at Montreal, Canada, by President James M. Good, in the following words :

*Ladies and Gentlemen :* We have in prospect the pleasure of listening to a few words of welcome from the President of the Pharmaceutical Association of Quebec, Mr. R. W. Williams, and from the President of the Montreal College of Pharmacy, Mr. Chapman.

MR. WILLIAMS : Mr. President, ladies and gentlemen of the American Pharmaceutical Association : It is my pleasant duty as President of the Quebec Pharmaceutical Association to welcome you to this our old Province of Quebec, to hold the 44th Annual Convention of your Association in the City of Montreal, the metropolis of the Dominion of Canada. Many of you are already favorably known to us, but we will be delighted to make your personal acquaintance. For the second time in the history of the Association you meet on Canadian soil, and we hope that this sojourn with the descendants of the Gaul and Saxon will be most pleasant and profitable. A meeting such as this cannot be otherwise than beneficial to your confreres, whose sphere of usefulness is so far east, and I am confident that all the Quebec Pharmacists who have the privilege of attending the sessions will ever remember the pleasure and profit derived therefrom. As I am to be followed by a more eloquent speaker, and in view of the large amount of work before you, it would ill become me to trespass upon your valuable time. Therefore, permit me with very few remarks to extend to you all a hearty welcome; and after your scientific labor is over, all those of you who were christened, or should have been christened, Isaac W. will find many days' sport on some of our numerous silver lakes and silvery streams, shaking the sham to tempt the lordly ouananiche or gamy trout. The poet and the sight-seer will also have ample scope in visiting the old city of Quebec, the Gibraltar of Canada, or some of the many waterfalls, notably the Shawenigan Falls, back of the ancient city of Three Rivers; and may your experiences, scientific as well as recreative, be such as to never permit you to forget your meeting of 1896.

MR. CHAPMAN : Mr. President, ladies and gentleman of the American Pharmaceutical Association : On behalf of the College of Pharmacy of Montreal I extend to you a hearty welcome to this city of ours, and also its hospitality. We have the reputation for being hospitable, and I trust that we shall live up to our reputation on this present occasion. We appreciate the honor you have done us in accepting our invitation to visit the me-



topolis of Canada, and we trust that you will realize that your northern brethren have similar interests and similar aims to those which you yourselves have across the line. I am very glad to see that in the work of this annual meeting the social aspect is not forgotten. I think it is well for us as pharmacists to develop this social aspect. We are very apt to be centred too much in our profession, to perhaps the neglecting of the higher duties which we owe to ourselves, our families and our country by developing the social side of our nature. We believe the old adage "that all work and no play makes Jack a dull boy," and we have tried to arrange some trips in the city and surrounding country which we hope will be instructive as well as interesting to you, and I hope that at the end of your visit you will be able to carry away with you nothing but pleasant memories of the city and its people. I am very sorry that I had not sufficient influence with the clerk of the weather to induce him to moderate the temperature here. Our representative who talked to you when pressing the claim of the city of Montreal for your annual meeting of 1896 made, I believe, the statement that it was pretty cool here at this season. I believe it is so as a rule, but this is exceptional, for, if I am rightly informed, it is 28 years since we had such a high temperature. We have, however, done our best, and I trust you will appreciate what we have done. We are your humble servants, and we shall do your commands, and do them to the best of our ability.

THE PRESIDENT: I will ask Prof. Patch, of Boston, to kindly respond to these remarks of welcome.

MR. PATCH: Mr. President and Members of the Montreal Association: Our President is a good man. There is more good in him than in any President the American Pharmaceutical Association has ever had. He has done very many good things which have given to all of us profound satisfaction. I certainly think, however, that he might have done better in selecting a representative of our worthy body to reply to your pleasant words of welcome. Yet it gives me a great deal of pleasure to express as best I can our appreciation of your kindness in thus welcoming us to your beautiful city. Older than many of our American cities that have outstripped it in growth, Montreal is of deep interest from its connection with the early history of the colonies. Many of the stirring events of the early days had their origin or consummation here. Here three hundred years ago the intrepid and immortal De la Salle rested in order to gain fresh strength for new toils and adventures. You still retain among your business blocks that old stone house which sheltered the gallant Montgomery and his staff. Its immediate vicinity could voice to us many words of inspiration and instruction, could stones speak and waters give intelligent utterance. On behalf of the American Pharmaceutical Association, I gratefully accept your tendered hospitality.

What a broad word that word "American" is; and as applied to our Association, we should remember that it must be given nearly its broadest signification. It covers the great northwest territory of Alaska; it covers all the British Provinces of America; it covers that great galaxy of States; it covers the islands of the Gulf; and we hope that ere long it shall cover the South American Republics.

The great value of such continental associations consists not alone in unifying the individual labors of its members and presenting them in a form of easy access to all, but it includes as well that broadening of mind which comes from a larger intercourse, and the correction of prejudices by a close acquaintance. The British flag and the maple leaf remind us that we have crossed the mystic line that separates Boy Orators, Coxey's armies, lunar hallucinations and Populism from the animosities of Liberals and Conservatives. You have, like us, broad prairies, similar fertile valleys, busy cities with magnificent churches substantial business blocks, active trade organizations, and as aggressive business houses as are found in a little lower latitude. You have also the same problems of education, of social economics, and of racial differences, and meeting with MacDonaldis, MacGregors,

and Duncans, who know only the Gaelic tongue, seems to indicate that some of your problems are as complex as are ours, I told you before that we brought to your city a good man in President Good. Possibly, I can say, we may leave you a good man as our President. Be that as it may, we have been long enough with you to learn that all the good people are not domiciled on the other side of the line. We have found that there are many on this side of the line—that stubborn line that separates the Provinces from the States. In my own case, I must admit that that is no new knowledge; for twenty-three years ago, on a beautiful day in June, I took with me over this line the best possession that life has bestowed upon me, and I have not had infrequent opportunity to learn from observation that I did not rob the Dominion of all its good possessions of that sort. But, gentlemen, a great proportion of our visiting members, I see, are beyond embracing such opportunities; yet I know very well that I voice their sentiments when I again express to you our hearty appreciation of your kindly welcome, and declare the sincere esteem which we shall always cherish towards the citizens of Montreal, and towards the various provincial pharmaceutical organizations, and towards the Local Secretary and his able committee of arrangements, for the earnest efforts you have exerted to render our short stay pleasant and profitable.

The President, having called Vice-President Dohme to the chair, delivered the following address :

*Ladies and Gentlemen, Friends and Fellow-members of the American Pharmaceutical Association :* We meet together here in the beautiful city of Montreal—a city so rich in historical associations—under favorable auspices, I am sure.

Familiar faces, our friends, our own members, greet us as we step over the boundary line, and assure us that the American Pharmaceutical Association is still within its home limits.

Those of you who think the Rio Grande and the St. Lawrence confine all there is of political, social or industrial importance on the continent of America, are guilty of excusable vanity, to be sure; but I suspect you will go home with a different impression.

With our cousins here we have many good things in common; but, unfortunately, the trade between New York and Quebec is not under control of interstate law: speed the time when it shall be! Until such is the order, let us advocate a rational policy of reciprocity for the regulation of our commercial relations.

Nations, like individuals, are selfish. They struggle alike to advance their own interests.

While we all, in theory, subscribe to the sentiments of universal brotherhood, and the "greatest good to the greatest number," yet no one people can advance on that line much more rapidly than the balance of the race. The danger lies in the fact that others, in practice, will, for their own benefit, take advantage of any beautiful general theories that we seek to reduce to practice: self-interest asserts itself, and the proverb, "Charity begins at home," is likely to be quoted; but whether under the "British flag," or the "Stars and Stripes," the stupendous march of the Anglo-Saxon race is a most striking fact; and we are here in Canada to emphasize our oneness, not any trifling dissimilarities.

Our annual coming together is always rightfully regarded as a red-letter period in the history of our Association. The closing administration gives an account of itself, and the new one is inaugurated.

The work mapped out for us at Denver has given us a busy year. There were more subjects of National importance claiming our attention than is usual, within a like period of time. While they have not all been brought to a complete and satisfactory issue, yet, withal, the results are gratifying.

Work well begun should be prosecuted to a successful end. Ultimate triumph is much when it means the correction of long-established, organized wrong—such as has been the order in the army, navy and marine hospital service.

Our committee on the status of pharmacists in these branches of the government service, under the leadership of Dr. George F. Payne, of Atlanta, Ga., has proven itself an energetic and efficient one.

Obstacles in the way of positive advance appear unexpectedly, when we find two divisions of a service jealously watching each other.

The navy department does not seem to be able to solve the problem of how to make the "line" and the "staff" work together harmoniously for the good of the service.

Those in the "line of succession" to the command of the ship are accused of being ungracious and inconsiderate.

We have no interest in the quarrel, further than it affects the unfortunate apothecary. We hope our committee will be able to steer its course so as to avoid Scylla on the one hand, and Charybdis on the other, and that pharmacists, in the employ of our government, may be ranked according to their required accomplishments.

The government of the United States treats its servants, ordinarily, with consideration and justice. It cannot afford to be less so than are other civilized nations.

It ought not to be difficult to convince our legislators that, if a man be possessed of a fair knowledge of materia medica, therapeutics, and minor surgery, and be able, during the temporary absence of the medical officer, to perform his duties, he may be justly entitled to rank with the "Sergeant major" and receive the same compensation.

As much as this our committee has asked.

In the navy, we find the rank and pay of the apothecary to be below that of the sail-makers and carpenters.

I do not wish to anticipate the report of our committee, but I express the hope that when it finishes its work, there will be an improvement in the status of the apothecary in our military service.

Probably the most important special committee, working during the past year, was the one appointed on "Weights and Measures" with instructions to co-operate with the American Metrological Society, and other societies, in petitioning Congress to pass a law making the use of the "Metric System" compulsory at an early date, in all "transactions where weights or measures, or both, are used." That they almost succeeded is a fact probably well known to all of you. That they did not succeed absolutely is no cause for discouragement. The wonder is that they did so well, when we reflect what it means to a nation to change a system of weights and measures—a system which is absolutely without system, but which, by education and use, has become a part of ourselves. All classes are affected. Fully a generation of people have grown from childhood to maturity in America since the active agitation of this subject began. It must be persistently pressed by scientific organizations, and more thoroughly taught in all our schools, before the people will be ready to accept it, in measuring values, in the daily transactions of life.

Mr. Taylor, writing a few years ago, on the subject of weights and measures, shows, very forcibly, the reasons for conservatism in this matter.

He says: "They enter into the economical arrangements and daily concerns of every family.

"The knowledge of them, in established use, is among the first elements of education, and is often learned by those who learn nothing else, not even to read and write.

"This knowledge is riveted in the memory by the habitual application of it to the employments of men throughout life.

"Every family has the weights used in the vicinity and recognized by the custom of the place.

"To change all this at once is to affect the well-being of every man, woman and child in the community. It enters every house, it cripples every hand."

Those opposed to the change, in England (they are agitating the subject there), are much gratified at having so able an ally as Herbert Spencer. One does not like to see so great a man as he on the wrong side of any question.

When he proposes to change our arithmetic, adopt a duodecimal notation in place of the one now in use, and construct an entirely new system of weights and measures, to correspond, he is not likely to have much of a following. Tried for this offense by a jury of his peers, he is quite certain to be condemned. But, by his acknowledged leadership, he commands attention. His arguments, pro and con, have been, in detail, fully and ably answered by one of our own members.

One, in reading after him, cannot help the thought that he deliberately puts behind him that which he and all of us need, when he says: "We want a better system, to facilitate both the thoughts and actions of men, and in so far diminish the friction of life.

The progress which the system has so far made, he calls the "Bureaucratic Coercion." "Its adoption has resulted from the official will, and not from the popular will."

"The opinions of shop-keepers were not asked," he says: In reply to this last, it may be said it is a matter about which the average shop-keeper is incapable of an intelligent opinion. He does not care about *systems* of weights and measures. He uses the actual, material things furnished him. He is familiar with the objects themselves, and soon learns their concrete force and value; and he will appreciate and endorse a system which is as simple as counting from one to one thousand.

The mass of mankind are followers. Our tradesmen would, to-day, be using the currency of England, if a better one had not been devised by Thomas Jefferson—or by some one having a talent for that kind of intellectual work.

In adopting the Metric system, Spencer pretends to see the necessity for a decimal division of the circle, and a general mixing up of dates and seasons, by a new table of time, running something like this: Ten seconds make a minute; ten minutes make an hour; ten hours make a day; ten days make a week; ten weeks make a month, and ten months make a year.

The system is defective, in his judgment, because in binary divisions we almost at once have fractions. But then they are *decimal* fractions, and are just as simple as whole numbers.

Measures of capacity can, and, by us, probably would, be constructed to represent one-half, one-fourth, one-eighth, or one-sixteenth of the unit.

That this system has already been adopted by nearly all of the civilized nations does not impress him as being a very important consideration, inasmuch as "England's external and internal commercial relations are, beyond question, greater than those of any other one nation."

With us they are intimate and important. They are likely to be between nations speaking the same language. She comes to us for her best dictionaries, and there is a kind of reciprocity in the matter of works on Pharmacy, which redounds to the advantage of all who use the English language. We would do well to set her an example in *this* matter. We trust that it cannot long be said, reproachfully, that Great Britain and the United States are the only two influential nations which have not adopted the "Metric System" of weights and measures.

An event of importance in the work of the Association this year is the issuing of a new edition of the National Formulary. The first edition was a popular work, and the second, an improvement on the first, is likely to be more so.

The chairman of the committee will report at the proper time. We have a committee on the Pharmacopœia which does good work; and the "Committee of the Revision" is undoubtedly grateful for any assistance which may come to it in this way.

The chairman of the Committee of Revision, in a paper read before the Section on Materia Medica and Pharmacy of the American Medical Association at the Atlanta meeting, discusses quite fully these two propositions:

1. Shall a table of average doses of drugs and preparations be given in the Eighth Decennial Revision of the U. S. Pharmacopoeia?

2. Shall a selected list of the new synthetic remedies be introduced into the same work?

This is a brief statement of the propositions which are given by him in a more elaborated form. He supports the affirmative with good arguments. To follow them is interesting, because one sees at the outset that the author is likely to reach conclusions which some of us suspect are the result of changed opinions. My judgment is that the instructions given the Committee of Revision by the last convention were correct and proper, but consistency does not demand that one shall in the year 1900 advocate the same measures that received his support in 1890.

It would, undoubtedly, be desirable to have introduced into our Pharmacopoeia a table of average doses of remedies. This would make the book more popular with druggists, as well as among the physicians.

There are difficulties in the way of preparing such a table for a work that is authoritative and likely to be used as such in cases of prosecution.

A physician might hesitate to administer an apparently excessive dose of any remedy, even though the exigencies of the case seemed to demand it, if it were possible to use such an authority against him. Furthermore, when "Doctors disagree" who shall say what is an average dose of any particular drug? It is thought possible, that if a carefully worded text accompany the table, these objections will lose their force, and the expression "average dose" has the merit of being a more elastic one than "maximum dose."

I should be in favor, therefore, of a resolution by this Association requesting the introduction into the next Pharmacopoeia of a "Table of Average Doses of Official Drugs and their Preparations."

As to the second proposition, it seems to me to deny official recognition to any medicinal agent which is protected by proprietary rights, is indisputably the correct ethical position.

Any of that character which are now so honored and "which cannot be produced otherwise than under a patent process," should be dismissed. The physician is not, by such action, deprived of their use as remedial agents.

Notwithstanding the fact that many of these synthetic compounds possess positive therapeutic value, and skill and knowledge have been exercised in their production, until our patent and trade-mark laws can be so changed as to protect the public against extortion, they should continue to bear the "stigma of illegitimacy."

Probably many of the claims which have been set up under the trade-mark and copyright laws would be found to be fictitious, if properly contested.

Certainly a law which will allow a person to register the name of a drug as a trade-mark, and thereby secure the monopoly of a medicinal substance for all time, is fundamentally wrong. In this matter we can learn of Germany and of England. If the unreasonableness of these laws could be properly brought to the attention of Congress, doubtless they would, in the near future, be modified. We must expect that any effort in this direction will be stubbornly opposed; but it is a matter of so much importance that I trust the Association will take it up, seriously and earnestly.

We have a good special committee on "National Legislation" (which might properly be increased in size), which has given this subject considerable attention.

Disinterested jobbing druggists and manufacturing chemists would undoubtedly favor legislation which would be unjust to none and bring relief to many.

Medicine and pharmacy will continue to acknowledge their debt to chemistry. That department of it which we call synthetic chemistry has been especially active and industrious during the past few years.

The lists of these newer remedies are, however, so much dishonored by the products of a pseudo-chemical character that we confess often, in reading them, to emotions akin to those with which we scan a price list of patent medicines.

The alcohol question is still an open one. The resolution which was passed at our annual meeting in 1894 is familiar to most of you. I submit a very slightly modified form of that resolution :

*Resolved*, That in the event of the passage of a bill providing for tax-free alcohol, it should be confined to alcohol used in the manufacture of chemicals, alkaloids, ethers, chloral, chloroform, and such other medicinal or industrial products as those in which the alcohol used will lose, absolutely, its chemical and physical properties.

We can probably unite in asking as much as this. The commission to be appointed, and to whom the subject of rebate on alcohol will be submitted, should have an opportunity to listen to a delegation from this Association.

I trust that you will agree with me that the occasion demands of us the appointment of such a committee.

An event of importance for the present year is the International Pharmaceutical Exhibition to be held at Prague, Austria, Aug. 15th to Sept. 15th.

To attend this exhibition, Dr. Fred. Hoffmann, now residing in Leipzig, Germany, has been appointed a delegate.

Greetings from us to their president of executive committee, it seems to me, would be proper for us to send and gratifying to their officers to receive.

The work of the American Pharmaceutical Association extends over a period of nearly half a century. Its records are intensely interesting in their showing of progress in medicine, chemistry, pharmacy, and the wonderful advancement in the arts and sciences. These records have a personal interest to our oldest members. Those who have "touched the two extremes and filled the interval" are very few, indeed. The aims of our Association have not changed in that time.

It is still our ambition to "improve and regulate the drug market;" "to prevent the importation of inferior or adulterated drugs;" and "to detect and expose adulterations;" "to encourage proper relations between physicians and pharmacists;" "to improve the art of pharmacy by the diffusion of scientific knowledge;" "to suppress empiricism;" "to uphold standards of authority in pharmaceutical education;" "to regulate the system of apprenticeship;" and finally, "to create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public."

Any association, as the term is ordinarily used, is made up of men or women, or both who associate themselves together for some specific purpose or object.

What they do, and how well they do it, depends upon the members themselves. We wish to stand, in every way, for what is best in American Pharmacy, professional, scientific, educational and commercial.

Each division is represented on our roll of members, but business ability and professional attainments should not be considered impossible of combination in one individual.

The roll is not too long. We invite membership of a desirable quality. Mutual benefit comes with co-operation; and the discovery is made that we all have much in common. Personal contact develops personal kindness, and both the business and the professional man will find the spirit of antagonism melt away under genial influences.

It was moved by Dr. Stewart, and seconded by Prof. Sayre, that the President's Address be received and referred to a Committee to be named by the President.

Carried.

President Good having resumed the chair, stated that he would announce the Committee on the President's Address before adjournment, and then proceeded to the regular order of business.

The reports of committees having been called for, the following were read by title and further consideration of the same deferred until the next session.

*The Committee on the Revision of the Pharmacopœia*—Leo Eliel, Chairman.

*Committee on General Prizes*—Edgar L. Patch, Chairman.

*Committee on the Ebert Prize*—J. U. Lloyd, Chairman.

*Committee on Membership*—H. M. Whelpley, Chairman.

*Auditing Committee*—Chas. E. Dohme, Chairman.

*Committee on National Legislation*—Dr. F. E. Stewart, Chairman.

*Committee on Transportation*—J. E. Morrison, Chairman.

*Committee on Finance*—Chas. E. Dohme, Chairman.

*Committee on the Status of Pharmacists in the Army and Navy of the U. S.*—Geo. F. Payne, Chairman.

*Committee on Publication*—C. Lewis Diehl, Chairman.

*Committee on Weights and Measures*—F. G. Ryan, Chairman.

*Committee on Credentials*—S. P. Watson, Chairman.

After a recess of ten minutes the Convention proceeded to a roll-call of the States and Territories and Provinces, for the purpose of selecting members of the Nominating Committee, with the following result :

Arkansas—W. L. Dewoody.

Dist. of Columbia—W. S. Thompson.

Florida—S. P. Watson.

Georgia—G. F. Payne, Joseph Jacobs.

Illinois—F. S. Hereth, C. S. N. Hallberg.

Indiana—C. W. Eichrodt.

Kansas—B. W. Woodward, L. E. Sayre.

Kentucky—A. J. Shoettlin, C. Lewis Diehl.

Maine—E. A. Hay, N. C. Earl.

Maryland—Chas. E. Dohme, Chas. Caspari, Jr.

Massachusetts—E. L. Patch, F. H. Butler.

Michigan—A. B. Prescott, A. B. Stevens.

Minnesota—C. R. J. Kellam, W. A. Frost.

Missouri—H. M. Whelpley, H. F. Hasselbrock.

New Jersey—M. Abernethy, G. W. Parisen.

New York—P. W. Ray, H. H. Rusby.

North Carolina—E. V. Zoeller, J. Y. MacRae.

Ohio—G. L. Hechler, C. T. P. Fennel.

Pennsylvania—Henry Trimble, F. G. Ryan.

Rhode Island—M. B. Wood, W. E. Cates.

South Carolina—H. Plenge, O. E. Thomas.

Tennessee—Jas. O. Burge.

Province of Nova Scotia—F. C. Simson.

“ Ontario—H. Watters, J. E. D'Avignon.

Province of Quebec—R. W. Williams, W. H. Chapman.

As delegates at large on the Nominating Committee, the President appointed A. E. Ebert of Illinois, J. P. Remington of Pennsylvania, Henry Gray of the Province of Quebec, Geo. W. Voss of Ohio and Jacob Betzler of New Jersey.

Notice having been given that the Nominating Committee would meet immediately after adjournment of the Session, the President called for the

reading of the minutes of the Council by the Secretary, G. W. Kennedy, as follows :

FIFTH SESSION OF THE COUNCIL, AUGUST 12TH, 1896.

Council convened at 9.30 a. m. in the Windsor Hotel, Montreal, Can. Chairman Thompson presided, with the following members present: Messrs. Alpers, Caspari, Diehl, Dohme, Good, Hallberg, Hechler, Kennedy, Morrison, Sadtler, Seabury, Sheppard, Voss, Watson and Whelpley.

H. M. Whelpley reported that 50 gold bars for the Montreal meeting had been made in compliance with instructions from the Council; bill for same was presented and referred to the Finance Committee.

The Secretary of the Committee on Membership presented the names of 62 applicants for membership, which on motion were referred to the Association for action.

The following items of business were reported as having been disposed of by correspondence since the last meeting held at Denver :

POTTSVILLE, PA., *October 3, 1895.*

*Dear Sir :* It is moved by W. S. Thompson and seconded by S. A. D. Sheppard that Mr. Karl Simmon of St. Paul, Minnesota, be appointed to fill the vacancy on the Transportation Committee from that section.

Please send your vote to the undersigned.

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Messrs. Alpers, Burgheim, Brandenberger, Caspari, Diehl, Dohme, Good, Gordon, Hallberg, Hechler, Kennedy, Miner, Morrison, Sadtler, Seabury, Sheppard, Thompson, Voss, Watson, Whelpley—20.

*Nays*—0.

*Not voting*—Ford—1.

POTTSVILLE, PA., *October 8, 1895.*

*Dear Sir :* It is moved by Chas. Caspari, Jr., and seconded by S. A. D. Sheppard, that the Permanent Secretary be instructed to subscribe, in the name of the American Pharmaceutical Association, to such pharmaceutical and chemical journals, both domestic and foreign, as may be desired by the Reporter on the Progress of Pharmacy for use in the compilation of his annual report.

Please send your vote to the undersigned.

Respectfully Yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Burgheim, Caspari, Diehl, Dohme, Good, Gordon, Hallberg, Hechler, Kennedy, Miner, Sadtler, Sheppard, Thompson, Voss, Watson, Whelpley—17.

*Nays*—0.

*Not voting*—Brandenberger, Ford, Morrison, Seabury—4.

POTTSVILLE, PA., *November 18, 1895.*

*Dear Sir :* Chas. Caspari, Jr., moves that the Council agree to pay the expenses connected with the work of the Special Research Committee of the Scientific Section, provided they do not exceed one hundred and fifty dollars (\$150); the money to be expended under the directions of Prof. A. B. Prescott, Chairman of the Committee. The above motion was seconded by W. S. Thompson.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Burgheim, Brandenberger, Caspari, Diehl, Dohme, Ford, Good, Gor-



don, Hallberg, Hechler, Kennedy, Sadtler, Seabury, Sheppard, Thompson, Voss, Watson. Whelpley—19.

*Nays*—0.

*Not voting*—Miner, Morrison—2.

POTTSVILLE, PA., November 29, 1895.

*Dear Sir*: It is moved by Chas. E. Dohme, and seconded by Wm. S. Thompson, that the following report of the Finance Committee on a budget of appropriations for the fiscal years 1895-6, and 1896-7, be adopted.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*To the Council of the Am Ph. Association: Gentlemen*: Your Committee on Finance having been instructed at the last meeting of the Association and Council (at Denver, Col.), to submit a budget of appropriations for the different items of expenditures of the Association for the fiscal year of 1895-96, and also one for the fiscal year 1896-97, beg leave to submit the following:

Salaries .....	\$2450 00
Traveling expenses .....	201 57
Proceedings .....	3000 00
Stenographer .....	125 00
Printing and stationery .....	225 00
Prizes .....	150 00
Insurance .....	25 00
Premium on Treasurer's bond .....	25 00
Journals (foreign and domestic) .....	50 00
Badges .....	29 40
Committee on Transportation .....	60 00
Committee on Membership .....	25 00
Section on Scientific Papers .....	100 00
Section on Education and Legislation .....	25 00
Section on Commercial Interests .....	32 00
Miscellaneous .....	325 00
<hr/>	
\$6747 97	

*Sums already expended (November 1, 1895).*

Salaries .....	\$1225 00
Traveling expenses .....	201 57
Proceedings .....	28 08
Stenographer .....	125 00
Printing and stationery .....	114 18
Prizes .....	150 00
Badges .....	29 40
Committee on Transportation .....	60 00
Committee on Membership .....	9 25
Section on Scientific Papers .....	29 50
Section on Education and Legislation .....	19 00
Section on Commercial Interests .....	32 00
Miscellaneous .....	39 23
<hr/>	
\$2062 21	

Leaving the following sums yet to be expended for the fiscal year 1895-96:

Salaries .....	\$1225 00
Proceedings .....	2971 92
Printing and stationery.....	110 82
Insurance .....	25 00
Premium on Treasurer's bond .....	25 00
Journals (foreign and domestic) .....	50 00
Committee on Membership.....	15 75
Section on Scientific Papers .....	70 50
Section on Education and Legislation.....	6 00
Miscellaneous.....	185 77
	<hr/>
	4685 76

*Budget for Fiscal Year 1896-1897.*

Salaries.....	\$2450 00
Traveling Expenses.....	150 00
Proceedings .....	3000 00
Stenographer .....	125 00
Printing and Stationery .....	225 00
Prizes .....	150 00
Insurance .....	30 00
Premium on Treasurer's bond.....	25 00
Journals (foreign and domestic).....	50 00
Badges.....	30 00
Committee on Transportation .....	60 00
Committee on Membership.....	25 00
Section on Scientific Papers.....	125 00
Section on Education and Legislation .....	50 00
Section on Commercial Interests .....	50 00
Miscellaneous .....	225 00
	<hr/>
	\$6765 00

Your Committee found it to be impossible to reduce the appropriations to the amount received from dues alone, of last fiscal year, viz: \$6175.00 as the expenditures for salaries and cost of publishing proceedings amounted to nearly 5500 dollars; hence leaving too small a sum for the other necessary expenditures of the year.

Your Committee is furthermore of the opinion, that, as the expenditures for National Formulary, Certificates, Badges, etc., come out of the common fund, the sums realized from the sales of National Formulary, Badges, Certificates, etc., should be added to the receipts from Annual Dues, and be subject to appropriations of annual expenditures, thus leaving the funds realized from Life Membership and interest on invested funds of the Association, for extraordinary appropriations to be made by the Council for special purposes.

Respectfully submitted,

CHARLES E. DOHME, *Chairman*.  
J. E. MORRISON,  
A. BRANDENBERGER.

*Yeas*—Burgheim, Brandenberger, Caspari, Diehl, Dohme, Good, Gordon, Hallberg, Hechler, Kennedy, Morrison, Sadtler, Sheppard, Thompson, Voss, Watson, Whelpley—17.

*Nays*—Alpers—1.

*Not voting*—Ford, Miner, Seabury—3.

POTTSVILLE, PA., *December 30, 1895.*

*Dear Sir* It is moved by George W. Kennedy and seconded by William S. Thompson, that the following application of Messrs. Lea Bros. & Co. be granted.

PHILADELPHIA, PA., *December 27, 1895.*

MR. WM. S. THOMPSON, WASHINGTON, D. C.: *Dear Sir*: As Chairman of the Council of the American Pharmaceutical Association, we desire to make application for permission to insert as a supplement in the National Dispensatory the new National Formulary, of course after its issue.

Many gentlemen who prefer to use the "National Dispensatory" have both suggested and requested that the Formulary be added. Trusting that Council will consider our request at the earliest practicable moment.

Yours very sincerely,

LEA BROS. & CO.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Committee.*

*Yeas*—Alpers, Brandenberger, Burgheim, Caspari, Dohme, Ford, Good, Gordon, Kennedy, Miner, Sheppard, Sadtler, Seabury, Thompson, Watson, Whelpley—16.

*Nays*—Hechler, Voss—2.

*Conditional*—Diehl, Hallberg, Morrison—3.

PHILADELPHIA, *January 7, 1896.*

MR. W. S. THOMPSON, 703 *Fifteenth Street, Washington, D. C.*: *Dear Sir*: Your kind favor of the 6th is at hand. Pray accept our sincere thanks for the permission to reprint the new "National Formulary" in the National Dispensatory, and if you will be so good as to convey our thanks also to the Council of the American Pharmaceutical Association, you will confer on us an additional kindness.

Yours very sincerely,

LEA BROS. & CO.

POTTSVILLE, PA., *January 8, 1896.*

*Dear Sir*: It is moved by Chas. E. Dohme and seconded by Wm. S. Thompson, that an extra appropriation of one hundred dollars (\$100.00) be made in excess of Budget submitted and passed by the Council to pay bill of the American Bank Note Company, for 100 certificates of membership on parchment, which was practically incurred before budget was passed upon.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Burgheim, Caspari, Diehl, Dohme, Ford, Good, Gordon, Hechler, Kennedy, Miner, Morrison, Sadtler, Seabury, Sheppard, Thompson, Voss, Whelpley—18.

*Nays*—0.

*Not voting*—Brandenberger, Hallberg, Watson—3.

POTTSVILLE, PA., *February 3, 1896.*

*Dear Sir*: The Permanent Secretary having informed the Chairman of the Finance Committee that the annual expenses for insurance, journals, printing and stationery will exceed the amounts appropriated for these items, and that the sum appropriated for miscellaneous expenses is unnecessarily large, it is hereby moved by Chas. E. Dohme that the Secretary of Council be directed to change the appropriation made by the Finance Committee for the items above mentioned for the two fiscal years 1895-96 and 1896-97, as follows:

Printing and stationery, .....	from \$225 to \$360
Insurance .....	" 25 to 30
Journals .....	" 50 to 60
Miscellaneous .....	" 225 to 75

The total amount appropriated will not be changed by these transfers.

The above motion is seconded by Chas. Caspari, Jr.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Burgheim, Caspari, Diehl, Dohme, Ford, Good, Gordon, Hallberg, Hechler, Kennedy, Miner, Sadtler, Seabury, Sheppard, Thompson, Voss, Watson, Whelpley—20.

*Nays*—0.

*Not voting*—Morrison.

POTTSVILLE, PA., *February 5, 1896.*

*Dear Sir*: Chas. E. Dohme moves the adoption of the following resolution, which is seconded by Chas. Caspari, Jr.:

*Resolved*, That in obedience to a resolution adopted by the Association at the last meeting held in Denver, the sum of two hundred dollars (\$200) is hereby appropriated for the use of the Commercial Section.

Please send your vote to the undersigned.

Yours truly,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Burgheim, Brandenberger, Caspari, Diehl, Dohme, Ford, Gordon, Hechler, Kennedy, Morrison, Sadtler, Seabury, Thompson, Voss, Watson—15.

*Nays*—0.

*Conditionally*—Alpers—1.

*Not voting*—Good, Hallberg, Miner, Sheppard, Whelpley—5.

POTTSVILLE, PA., *February 25, 1896.*

*To the Members of the Council*: The chair begs to announce that the motion made by the Chairman of the Finance Committee, Mr. Dohme, appropriating \$200 for the use of the Commercial Section, has received a majority vote of the Council. At the same time, some of the members declined to vote on the question, and called for the reading of the resolution of the Association referred to in Mr. Dohme's motion. In answer to this call, the Chair submits a copy of the resolution for the information of the members, with the statement that should any member voting for Mr. Dohme's motion desire a reconsideration, the members will be recognized for that purpose, provided the motion is received by the Secretary within one week from this date, otherwise the first action of the Council will stand and the draft be issued.

Respectfully yours,

W. S. THOMPSON, *Chairman.*

Mr. Hallberg's motion, seconded and carried at the last general session,—“I move that it is the sense of the Association that the Finance Committee appropriate a sum not to exceed \$200 for the use of the Commercial Section during the year, provided that the Finance Committee deem it advisable from the condition of the treasury.”

Transmitted by the Secretary of the Council,

GEO. W. KENNEDY.

POTTSVILLE, PA., *March 24, 1896.*

*Dear Sir*: It is moved by Chas. Caspari, Jr., and seconded by C. Lewis Diehl, that the Permanent Secretary be directed to send complimentary copies of the Revised Edition of the National Formulary to the different colleges and schools of pharmacy, medical schools, pharmaceutical and medical journals, State pharmaceutical and medical associa-

tions and foreign associations, as was done by the Association upon appearance of the first edition in 1888.

Please send your vote to the undersigned.

Respectfully,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Brandenberger, Burgheim, Caspari, Dohme, Ford, Good, Gordon, Hallberg, Hechler, Kennedy, Miner, Morrison, Sheppard, Thompson, Voss, Whelpley, Sadtler, Seabury—19.

*Nays*—Watson—1.

*Not voting*—Diehl—1.

POTTSVILLE, *March 23, 1896.*

*Dear Sir:* It is moved by C. Lewis Diehl, and seconded by Chas. Caspari, Jr., that the price for the 1895 Proceedings be fixed at \$5.50 for paper cover and \$6.00 for cloth bound copies.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Brandenberger, Burgheim, Caspari, Dohme, Ford, Good, Gordon, Hallberger, Hechler, Kennedy, Morrison, Sheppard, Thompson, Voss, Watson, Whelpley, Sadtler, Seabury—19.

*Nays*—Miner—1.

*Not voting*—Diehl—1.

POTTSVILLE, *March 23, 1896.*

*Dear Sir:* It is moved by Chas. Caspari, Jr., and seconded by C. L. Diehl, that the price for interleaved and sheep-bound copies of the revised edition of the National Formulary be fixed as follows: cloth bound, interleaved, \$1.25 per copy; sheep bound, \$1.35 per copy; sheep bound, interleaved, \$1.50 per copy. The price of \$1.00 per copy for plain cloth binding was fixed by the Association at Denver.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Burgheim, Caspari, Dohme, Ford, Good, Gordon, Hallberg, Hechler, Kennedy, Miner, Morrison, Sheppard, Thompson, Voss, Watson, Whelpley, Sadtler, Seabury, 19.

*Nays*—Brandenberger—1.

*Not voting*—Diehl—1.

POTTSVILLE, PA., *March 31, 1896.*

*Dear Sir:* It is moved by Henry M. Whelpley and seconded by Chas. Caspari, Jr., that the Permanent Secretary be directed to have six hundred copies of the revised Constitution and By-Laws struck off for the use of the Committee on Membership, this number allowing about ten copies to each member of the Committee.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Burgheim, Brandenberger, Caspari, Dohme, Ford, Good, Gordon, Hallberg, Hechler, Kennedy, Miner, Morrison, Sheppard, Thompson, Voss, Watson, Whelpley, Sadtler, Seabury—20.

*Nays*—0.

*Not voting*—Diehl—1.

PHILADELPHIA, *March 7, 1896.*

*Dear Sir:* We respectfully ask permission of your honorable body to insert the text of the National Formulary in the United States Dispensatory, and Practice of Pharmacy, in accordance with the resolution of the Association, 1894, page 82.

Very respectfully yours,

J. B. LIPPINCOTT COMPANY.

POTTSVILLE, PA., *April 9, 1896.*

*Dear Sir:* It is moved by W. S. Thompson, and seconded by Geo. W. Kennedy, that the permission asked above be granted without compensation, as was done on a like request by the National Dispensary publishers.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Burgheim, Brandenberger, Caspari, Dohme, Goud, Gordon, Hallberg, Hechler, Kennedy, Miner, Sheppard, Sadtler, Seabury, Thompson, Whelpley—16.

*Nays*—Voss—1.

*Not voting*—Diehl, Ford, Morrison, Watson—4.

# PROGRAMME FOR THE FORTY-FOURTH ANNUAL MEETING TO BE HELD AT MONTREAL, CANADA.

*Wednesday, August 12th.*

- 9:30 a. m. Council Meeting.
- 2:30 p. m. First General Session.
- 9:00 p. m. Reception tendered by the Pharmaceutical Association of the Province of Quebec and the Montreal College of Pharmacy, in the parlors of the Windsor Hotel.

*Thursday, August 13th.*

- 10:00 a. m. Second General Session.
- 3:00 p. m. Section on Commercial Interests.
- 8:30 p. m. Section on Commercial Interests.

*Friday, August 14th.*

- 10:00 a. m. Section on Scientific Papers.
- 3:00 p. m. Electric car ride through the city of Montreal, Outremont, Côte des Neiges, etc.
- 8:30 p. m. Section on Scientific Papers.

*Saturday, August 15th.*

- 10:00 a. m. Section on Scientific Papers.
- 3:00 p. m. Section on Pharmaceutical Education and Legislation.
- 8:30 p. m. Section on Pharmaceutical Education and Legislation.

*Sunday, August 16th.*

Devoted to rest.

*Monday, August 17th.*

- 9:30 a. m. Trip through Lachine Canal, Lake St. Louis and Lachine Rapids, descending the river St. Lawrence to Boucherville and Vercheres.

*Tuesday, August 18th.*

- 10:00 a. m. Section on Pharmaceutical Education and Legislation.
- 8:30 p. m. Concert in Windsor Hall.

*Wednesday, August 19th.*

- 10:00 a. m. Final General Session.

POTTSVILLE, PA., April 18, 1896.

*Dear Sir* : It is moved by Jos. E. Morrison and seconded by Chas. Caspari, Jr., that the above programme be adopted.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Brandenberger, Caspari, Diehl, Dohme, Good, Gordon, Hechler, Kennedy, Miner, Morrison, Sadtler, Seabury, Sheppard, Thompson, Voss, Watson, Whelpley—18.

*Nays*—0.

*Not voting*—Burgheim, Ford, Hallberg—3.

POTTSVILLE, PA., May 16, 1896.

*Dear Sir* : It is moved by C. L. Diehl and seconded by Geo. W. Kennedy that State Pharmaceutical Associations may, on application to the Council, be granted the privilege to prepare and issue an epitome of the National Formulary, on the line of that issued by the Kentucky Pharmaceutical Association in 1895, for distribution among the physicians of their respective States.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Brandenberger, Caspari, Diehl, Dohme, Ford, Good, Gordon, Hallberg, Hechler, Kennedy, Miner, Sheppard, Sadtler, Seabury, Voss, Watson, Whelpley—18.

*Nays*—0.

*Not voting*—Burgheim, Morrison, Thompson—3.

POTTSVILLE, PA., June 23, 1896.

*Dear Sir* : In consideration of the fact that the cost of publishing and distributing the 43d volume of the Proceedings, as reported by the Permanent Secretary, is considerably in excess of the appropriation made for that purpose by the Finance Committee, it is moved by the undersigned, as chairman of the Finance Committee, that the Council appropriate an additional sum of four hundred dollars to cover the deficit incurred as above stated. The increased cost, above the appropriation, is largely due to the incorporation of the revised edition of the National Formulary, which was ordered by the Association at Denver, and moreover it is impossible to fix definitely in advance the cost of such work as the publication of the annual report of the Proceedings. With the increased appropriation, the cost of the 1895 volume will still be about \$385.00 below that for 1894.

CHAS. E. DOHME.

Seconded by Chas. Caspari, Jr.

Please send your vote to the undersigned.

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Caspari, Diehl, Dohme, Ford, Good, Gordon, Hallberg, Hechler, Kennedy, Miner, Sadtler, Seabury, Sheppard, Thompson, Voss, Watson, Whelpley—17.

*Nays*—Alpers—1.

*Not voting*—Burgheim, Brandenberger, Morrison—3.

POTTSVILLE, PA., July 17, 1896.

*Dear Sir* : It is moved by Chas. Caspari, Jr., and seconded by Samuel A. D. Sheppard, that Dr. H. M. Whelpley be requested to have fifty gold bars made, for the meeting at Montreal, of the character as heretofore.

Please send your vote to the undersigned.

Respectfully yours,

GEO. W. KENNEDY, *Secretary of Council.*

*Yeas*—Alpers, Burgheim, Caspari, Diehl, Dohme, Good, Gordon, Hallberg, Hechler,

Kennedy, Miner, Morrison, Sadtler, Seabury, Sheppard, Thompson, Voss, Watson, Whelpley—19.

*Nays*—0.

*Not voting*—Brandenberger, Ford—2.

The Secretary of the Committee on Membership, G. W. Kennedy, presented his annual report, which upon motion was accepted and directed to take the usual course.

The Chairman, Wm. S. Thompson, read his report on the invested funds of the Association, which upon motion was directed to be presented to the Association at the general session.

The Treasurer, S. A. D. Sheppard, presented his annual report, which on motion was directed to be read before the Association.

The Permanent Secretary, Chas. Caspari, Jr., read his report on the financial accounts in the custody of the Secretary, which upon motion was accepted and referred.

The report of the Committee on Publication was read by Chas. Caspari, Jr., and after considerable discussion, was, upon motion of C. S. N. Hallberg, adopted.

H. M. Whelpley moved that hereafter the Council will grant publishers of pharmaceutical and medical works the privilege to incorporate the National Formulary as a part of the body of the work only, not as a supplement. Also, that for this privilege the Association shall receive a remuneration, which shall be fixed by the Committee on Publication. The motion having been duly seconded, was agreed to.

Chas. E. Dohme, Chairman of the Finance Committee, presented and read his report, which was, on motion of C. S. N. Hallberg, adopted.

S. A. D. Sheppard moved the adoption of the following, which was seconded by Chas. E. Dohme: That Council recommend to the Association to amend Article IV. Chapter VII. of the By-laws, by striking out in line five, the word "forty," and inserting in place thereof the word "thirty-seven." Agreed to.

It was moved by Wm. C. Alpers and seconded by Chas. Caspari, Jr., that the rule in regard to publication of names of dropped members, which has been followed for a number of years, be adopted as a general rule of the Association until further action. C. S. N. Hallberg moved to lay the motion on the table, which was lost, and the original motion adopted.

Chas. E. Dohme, Chairman, read the report of the Auditing Committee on the reports of the Chairman of Council, Treasurer and Permanent Secretary, which on motion was adopted and referred to the Association.

On motion of Geo. W. Kennedy, the Permanent Secretary was directed to sign all railroad certificates presented to him.

The Chicago College of Pharmacy, through W. B. Day, actuary, made application for the donation of the annual volumes of proceedings for 1851, 1852, 1854, 1855, 1872, 1876, 1877, 1881, 1883 and 1889, to complete their set. Upon motion, the request was granted.

GEO. W. KENNEDY, *Secretary of Council.*

Upon motion of Mr. Sheppard, seconded by Mr. Ebert, the minutes of the Council were adopted as read.

The Secretary of the Council, G. W. Kennedy, read the names of 62 applicants for membership which had been referred by Council. Upon motion, the list was directed to be posted for inspection, as provided for in the by-laws.

The following gentlemen were appointed by the Chair as Committee on the President's address: Messrs. C. Lewis Diehl, Chairman, F. H. Butler



and Wm. C. Alpers. The President also appointed the following Committee on Time and Place of Next Meeting: Messrs. Wm. C. Alpers, Wm. A. Frost, James O. Burge, S. A. D. Sheppard and C. T. P. Fennel.

Special invitations having been received from the cities of Nashville, Minneapolis and Saint Paul, the Secretary was directed to present these to the Committee on Time and Place of Next Meeting for consideration.

The following is the text of the invitations:

CHAMBER OF COMMERCE, NASHVILLE, TENN., July 27, 1896.

*American Pharmaceutical Association, Montreal, Canada:*

*Gentlemen:* The Chamber of Commerce of Nashville, Tenn., together with other official bodies of this city, beg very respectfully to tender herewith a most cordial and pressing invitation for your Association to hold its annual convention of 1897 in the city of Nashville during the pendency of our Tennessee Centennial Exposition, opening May 1, 1897, and continuing six months.

We can assure you a most hearty and cordial welcome, and will use all possible means to make your stay among us pleasant, and we feel sure that the recollections of your visit to Tennessee will be a matter of pleasure both to yourselves and the people of our city.

The many attractions and inducements that our State and city have to offer for the meeting here of the different organizations of the country in our centennial year, 1897, are set forth in part in the accompanying circular. Side trips to any and all points of interest, the many battle-fields, Hermitage, Lookout Mountain, celebrated stock farms, etc., etc., etc., can be made in a few hours' ride at greatly reduced rates. Many of the principal points can be reached without change.

Trusting to have the presence of your Association in our city next year, we remain,  
Very respectfully, NASHVILLE CHAMBER OF COMMERCE.

By A. J. HARRIS, *President*.

A. W. WILLS, *Secretary*.

NASHVILLE, TENN., July 27, 1896.

*American Pharmaceutical Association, Montreal, Canada:*

*Gentlemen:* The City Council of Nashville, Tenn., begs most heartily to unite in extending a most cordial invitation to your Association to hold its Annual Convention in Nashville during our Centennial year, 1897. We will receive you with open arms.

Respectfully

NASHVILLE CITY COUNCIL,

By A. J. WILLIAMS, *President*.

NASHVILLE, TENN., July 27, 1896.

*American Pharmaceutical Association, Montreal, Canada:*

*Gentlemen:* The Tennessee Centennial joins most heartily in the accompanying invitations, and will be greatly pleased to have you visit our beautiful city in 1897.

We propose to hold one of the grandest Industrial Expositions ever witnessed in this country for the purpose of celebrating the One Hundredth Anniversary of the admission of the State of Tennessee into the Federal Union.

On account of the many conventions to assemble in Nashville next year, we will be able to secure for you a very low transportation rate, and will have the necessary Convention Hall in which to hold your meetings furnished gratuitously.

We will also take pleasure in arranging excursions at greatly reduced rates, should you desire to visit Lookout Mountain, Mammoth Cave, and other noted places in this vicinity.

We deem it proper to state to you, however, that owing to the large number of associations which will visit us in 1897, we cannot arrange for the entire management of

entertainments, programs, etc., prepared for the different conventions, but will aid you all in our power, and have organized a special department for the purpose.

Trusting that you may decide to come to see us, we remain,

Yours very truly,

TENNESSEE CENTENNIAL,  
By E. C. LEWIS, *Director General*.

OFFICE OF BOARD OF PUBLIC WORKS AND AFFAIRS, }  
NASHVILLE, TENN., July 27, 1896. }

*American Pharmaceutical Association, Montreal, Canada :*

*Gentlemen :* The Board of Public Works and Affairs, of Nashville, Tenn., joins with His Honor, the Mayor, and others, in extending a most cordial invitation to your Association to meet in Nashville in 1897.

Respectfully,

BOARD OF PUBLIC WORKS AND AFFAIRS,  
Per GEO. W. STAINBACK, *Chairman*,

OFFICE OF THE MAYOR, NASHVILLE, TENN., July 27, 1896.

*American Pharmaceutical Association, Montreal, Canada :*

*Gentlemen :* I take pleasure in endorsing the invitation extended by the Chamber of Commerce to your Honorable Body to hold your next Annual Convention in this city during our Centennial year. We will see that you receive a most cordial, hearty greeting, and that your stay shall not only be pleasant, but profitable to each of you.

Yours respectfully,

WM. M. MCCARTHY, *Mayor*.

EXECUTIVE CHAMBER, NASHVILLE, TENN., July 27, 1896.

*American Pharmaceutical Association, Montreal, Canada :*

*Gentlemen :* Permit me, on behalf of the State of Tennessee, to invite you to hold your next Convention in the City of Nashville. The State of Tennessee will celebrate the One Hundredth Anniversary of its admission into the Union by holding a grand Exposition in the City of Nashville during the spring, summer and fall of 1897.

Our people are making elaborate preparations to receive and entertain all visiting associations, and it is the desire of the people of the State, expressed through me, that the members of your Association give us the pleasure of your presence at some time during the continuance of the Exposition.

Yours respectfully,

P. TURNEY, *Governor*.

TENNESSEE CENTENNIAL EXPOSITION CO., }  
NASHVILLE, TENN., July 27, 1896. }

*Secretary American Pharmaceutical Association, Montreal, Canada :*

*Dear Sir :* As representatives of the daily press of Nashville, we join most cordially in inviting your Association to hold its next meeting in this city. We will gladly publish all proceedings of your meetings, and will extend such other courtesies as are usually due from the press on such occasions.

"THE AMERICAN," by JNO. C. BURCH, *General Manager*,

"THE BANNER," by G. M. FOSTER,

"THE SUN," by A. L. ROWE, *Business Manager*.

NASHVILLE, TENN., August, 1896.

*American Pharmaceutical Association, Montreal, Canada :*

*Gentlemen :* Tennessee proposes to celebrate the one hundredth anniversary of her admission to the Federal Union by holding at Nashville an International Exposition, beginning May 1, 1897, and continuing for six months.

The Tennessee Centennial and International Exposition has been organized and will

be carried out on a grand scale, and in a manner worthy not only of the State of Tennessee, but of the whole country.

In view of this fact, the undersigned respectfully tender you a cordial invitation to hold your next annual meeting in this city. This invitation will be supplemented by others, but it was thought particularly appropriate that those directly interested in pharmacy and engaged in its practice, should unite in sending a special one, and insist on its acceptance.

Very respectfully,  
 TENN. BOARD OF PHARMACY, R. H. Gordon, *Pres.*  
 SPURLOCK NEAL CO., *Wholesale Drugs*,  
 BERRY, DEMOVILLE & CO.,  
 LAEVERET & THOMAS,  
 W. H. SMITH & BRO.,  
 J. O. BURGE,  
 VAUGHN & PARTIE,  
 ROBT. L. EVES, and 28 other firms.

THE COMMERCIAL CLUB, ST. PAUL, MINN., *August 8, 1896.*

*The American Pharmaceutical Association :*

St. Paul joins with her sister city of Minneapolis in extending greetings and good will to the American Pharmaceutical Association, and cordially invites it to hold its 1897 convention in the Twin Cities. The advantages of the cities are great; their hotel facilities are not excelled in any of the large cities of the country, and a thousand beautiful lakes surrounding them, will add greatly to the pleasure and comfort of the meeting.

Very respectfully,  
 E. YANISH, *President*.  
 D. R. MCGINNES, *Secretary*.

EXECUTIVE DEPARTMENT, MINNEAPOLIS, MINN., *August 4, 1896.*

*To the American Pharmaceutical Association :*

By unanimous vote of the Honorable City Council of the city of Minneapolis, passed July 31, 1896, I am requested to convey to your Association an urgent and cordial invitation to meet in convention in this city next year. Your acceptance of it will be a compliment which our people will show their appreciation of, by trying in every possible way to make your stay pleasant and agreeable. I desire personally to supplement the invitation of our Council, and beg you to accept of our hospitality.

Very truly yours,  
 ROBT. PRATT, *Mayor*.

EXECUTIVE DEPARTMENT, ST. PAUL, MINN., *August 7, 1896.*

*To the American Pharmaceutical Association in Convention Assembled, Montreal, Can.:*

*Gentlemen :* In behalf of the people of this Commonwealth, I have the honor to extend to the American Pharmaceutical Association a cordial invitation to hold its next meeting in the "Twin Cities," St. Paul and Minneapolis.

It is needless for me to extol the merits of St. Paul and Minneapolis as convention cities. Their reputation as such is national. Their hotel accommodations and railroad facilities are unequaled, and their citizens are unsurpassed in affording entertainment to their guests.

Should your choice fall upon these cities, I guarantee to the members of the Association a pleasant time and a successful convention.

I have the honor to be

Yours very respectfully,  
 D. M. CLOUGH, *Governor*.

MINNESOTA STATE PHARMACEUTICAL ASSOCIATION, AUSTIN, *August 8, 1896.*

*To the American Pharmaceutical Association :*

*Gentlemen :* The Minnesota State Pharmaceutical Association at its annual meeting in June of this year adopted a resolution that "we extend a hearty greeting and a cordial

invitation to the American Pharmaceutical Association to hold its annual meeting for 1897 in our State." Said resolution was adopted unanimously.

Yours very respectfully,

EDWARD C. DORR, *President*.

Attest: CHARLES T. HELLER, *Secretary*.

THE COMMERCIAL CLUB, MINNEAPOLIS, MINN., *July 20th, 1896.*

*To the American Pharmaceutical Association:*

Minneapolis extends greetings and cordially invites your Association to hold its 1897 convention at the dual metropolis of the northwest—the twin cities of Minneapolis and St. Paul. We can assure you a most cordial welcome, as well as generous entertainment.

Respectfully,

D. M. CLOUGH, *Governor of Minnesota,*

ROBERT PRATT, *Mayor of Minneapolis,*

G. D. ROGERS, *Secretary Chamber of Commerce,*

CHARLES W. BROWN, *Pres. Jobbers and Manufacturers Association,*

J. F. CALDERWOOD, *President The Commercial Club.*

CITY CLERK'S OFFICE, ST. PAUL, MINN., *August 6, 1896.*

*Assembly F., No. 2958. By W. T. Kirke:*

*Resolved*, That the Mayor be and is hereby directed to send greetings of the Common Council of the city of St. Paul to the "American Pharmaceutical Association," and invite it to hold its next annual convention, for the year 1897, in the city of St. Paul.

Adopted by the Assembly, August 6, 1896.

*Yeas*—Messrs. Craig, Daly, Kirke, Krahmer, Lewis, Mabon, Thompson, Mr. President.

F. B. DORAN, *Mayor*.

*Attest*: MATT. JENSEN, *City Clerk*.

MR. DOHME: I have heard that the city of Nashville and Lake Minnetonka are suggested for our next meeting, and as a representative of Maryland I do not wish to come in competition for the next meeting, but I should like to put in a plea for Baltimore in the following year. We have not had a meeting in Baltimore since 1870, and I think it would be very proper if we should meet there the following year. I extend an invitation to the American Pharmaceutical Association on the part of the pharmacists of Baltimore for 1898.

THE PRESIDENT: Incidental business is now in order.

MR. EBERT: Mr. President, we might now take up for action the proposed amendments to the constitution which were laid over for one year at our last annual meeting.

The Permanent Secretary read the proposed amendments, as follows:

Amend paragraph 2 of Article I by adding the word "such" after "encourage;" substitute the word "among" for "between," and the words "as may" for "which shall."

Amend Article III by substituting the word "General" for "Permanent" in the second line, and take out the words "with the exception of the Permanent Secretary" in the third line. Put a period after the word "Council" in the fourth line, and substitute the word "they" for "and" in the same line.

Amend Article III by adding the following sentence at the end of the Article: "No member shall be eligible to any of these offices until after he shall have been an active member for at least five years."

There being no discussion in regard to the first two amendments, they were, on motion of A. E. Ebert, seconded by W. S. Thompson, adopted.

It is moved by Mr. Main that the second amendment to Article III. be laid on the table.

MR. SHEPPARD: Mr. President, I think there is a great misunderstanding in regard to this matter. I had overlooked it entirely. We had it up last year so far as the members of the Council are concerned. Now, it was a very proper thing to have these men, who are to serve us for three years as members of the Council, old members; but this change which is proposed is altogether too sweeping in its character. We certainly do not want it. Some of the very best work that has been done in this Association has been done by the Vice-Presidents who have just come into harness, young men who are full of zeal and earnestness, and ready to put their hands to the wheel. We do not want to crowd these young men out. We have nine members of the Council who come under this rule of old members. There are also always on the board of officers enough older members to keep the balance right. There is not the slightest danger of the Council, as now constituted, ever being run away with by young men. The Chairmen of the sections are always older men, and with the nine members it will be one of the most unwise things possible to make any such changes as these, and I certainly hope, Mr. President, on no account whatever will this proposed amendment be adopted.

The motion to lay the amendment on the table was put and carried—  
ayes 37, nays 26.

Several amendments to the By-Laws were laid over for action at a future session.

MR. SHEPPARD: Before we adjourn I have a pleasant word to bring to the Association. If we look at the list of our members who are now residing in foreign countries, we will find the name of one man who joins us simply because he loves pharmacy. Nearly all of our foreign members are men who formerly lived in this country and afterwards moved abroad; but in 1891 Mr. Nicholas H. Martin, of Newcastle-on-Tyne, England, felt that he wanted to throw in his lot with the American Pharmaceutical Association, and became an active member. Many of us had the pleasure of meeting Mr. Martin several times here among us, and more especially at the meeting in Chicago at the time of the International Pharmaceutical Congress, when he came to us as a delegate from Great Britain. He is, as you know, an Ex-President of the British Pharmaceutical Conference. I received from him a couple of days ago a letter somewhat personal in character, but a certain part of which belongs to you: "I wish especially that you would tell the members of the Association and the Local Committee how keenly I regret that the distance makes it impossible for me to be with you at the forthcoming meeting at Montreal. I have received the circulars of the Local Secretary, and it reminds me of all the delightful recollections which I have of my stay in that city when the British Association met there in 1884. It is a charming city, and I shall be thinking of you and following your itinerary from day to day in August."

I move, Mr. President, that our Secretary send to Mr. Martin the greetings of the members present at this meeting.

The motion was seconded by Mr. Main and carried.

MR. HALLBERG: Mr. President, when I heard this communication read from Mr. Martin I was reminded of the fact that Mr. Martin was one of the Vice-Presidents of the International Congress, and that we should have received by this time a report from some of the officers of the Pharmaceutical Congress. It is now three years since that Congress

met. There has been no report made. If I am in order, Mr. Chairman, I would move that we appoint a committee to discover why there has been no report made.

THE PRESIDENT: I do not like the form in which the motion is put. You may call on some member of the Committee for information. There are members present.

THE SECRETARY: I would state for Prof. Hallberg's information that this subject of the proceedings of the International Congress was disposed of at Asheville, and a Committee appointed, consisting of three members, who were instructed to publish the report of the proceedings of the International Congress. The Council voted them a certain amount of money; the text was to be in the English language, but the resolutions adopted by the International Congress were to be published in English, French, and German. That Committee has, so far, not reported.

DR. WHELPLEY: I would like to ask if the Committee drew the money.

THE SECRETARY: No, the money is still in the hands of the Treasurer.

MR. REMINGTON: Mr. President, I am a member of the Committee. I fully expected that Prof. Oldberg of Chicago would be here. I have been holding some correspondence with Prof. Oldberg within the last three years. He has the minutes of the Congress, and he has assured me a number of times that these minutes were ready for publication and would be forthcoming within a few weeks; but the weeks have lengthened into months, and after repeated letters I have been unable to see the printed proofs. I think it is perfectly proper for this Association at this time to take some action upon this matter, and call upon Prof. Oldberg to put these minutes into shape.

THE PRESIDENT: I believe Prof. Remington is Chairman of the Committee.

MR. REMINGTON: It is probable that I am, but I can do nothing until I get the minutes of the Congress from the Secretary. Whatever action the Association wishes to take after hearing this statement will be perfectly proper.

The Secretary read an abstract of the minutes of the Asheville Meeting, September 6th, 1894, having reference to this matter.

MR. REMINGTON: I move that the whole matter be referred to the Council.

The motion was duly seconded and carried.

MR. HALLBERG: I think that the Committee on Entertainments should make a formal report.

MR. MORRISON: The programme of Entertainment has been published. This evening the reception will be held here, and we hope to have as many as possible present. On Friday there is to be a car ride. There is nothing special besides the regular entertainments which are mentioned on the programme. We have made arrangements for visits to the Art Gallery, The Natural History Society Rooms, McGill and Laval Universities, and we will announce to-morrow definitely as to these places. Of course, we do not want to infringe upon the time of the regular sessions. Those who are interested in the Scientific Section might visit these places, while the Commercial Section is in session, and vice versa. That is about the only thing we have to bring up besides what is on the programme.

MR. REMINGTON: Prof. Saunders, who was here this afternoon, and, no doubt, was recognized by many of the older members, desires me to say that inasmuch as he was

compelled to leave for Ottawa by the four o'clock train, if any members who would like to go to Ottawa—I believe there is to be the opening of Parliament there next Thursday—to see the parliament buildings or attend the opening, he would be very glad if they would give their names to one of the Canadian members, Mr. Morrison, for instance, who would send their names to him, and it would be a pleasure to him to go around with them in the city of Ottawa during the next three or four days.

A motion by Mr. Seabury that this invitation be accepted with thanks was carried.

Upon motion, duly seconded, the Association, at 6.30 p. m., adjourned until 10 o'clock Thursday morning.

#### SECOND SESSION—THURSDAY, AUGUST 13, 1896.

The second general session of the Association was called to order by President Good at 10.30 a. m.

The minutes of the first session were read by the Permanent Secretary, and on motion of C. Lewis Diehl, duly seconded, adopted as read.

The President having called for the report of the Nominating Committee, the same was submitted by H. M. Whelpley, Secretary, with the following recommendations :

*President*—Joseph E. Morrison, Montreal, Can.

*First Vice-President*—George F. Payne, Atlanta, Ga.

*Second Vice-President*—William A. Frost, St. Paul, Minn.

*Third Vice-President*—George W. Parisen, Perth Amboy, N. J.

*Treasurer*—Sam'l A. D. Sheppard, Boston, Mass.

*General Secretary*—Chas. Caspari, Jr., Baltimore, Md.

*Reporter on the Progress of Pharmacy*—C. Lewis Diehl, Louisville, Ky.

*Members of Council*—James M. Good, St. Louis, Mo.; Joseph P. Remington, Philadelphia, Pa.; Chas. E. Dohme, Baltimore, Md.

On motion the report was approved, and the Association proceeded to vote for President, Messrs. Stevens and Hereth having been appointed tellers by the Chair. The result of the ballot disclosed the unanimous election of Joseph E. Morrison as President for the coming year.

Upon motion of Thos F. Main, the Permanent Secretary was directed to cast an affirmative ballot for the remainder of the nominees, which duty having been performed, the President declared all the gentlemen proposed by the Nominating Committee elected to the respective offices.

G. W. Kennedy, Secretary of Council, at the request of the President, read the minutes of the sixth session of Council as follows :

#### SIXTH SESSION OF COUNCIL—AUGUST 13, 1896.

The Secretary of the Committee on Membership presented the names of fourteen applicants, which on motion, were directed to take the usual course.

The Illinois Pharmaceutical Association having applied to Council for permission to use the text of the National Formulary for the publication of an epitome for the use of

its members, the request was, on motion of G. W. Kennedy, referred to the Committee on Publication.

Upon motion of the Secretary the minutes of Council were approved as read, and the Secretary of Council was directed to invite the sixty-two gentlemen, whose names had been read at the first general session, to complete their membership, the names having been duly posted and remained unchallenged.

The President having called for the report of the Committee on Time and Place of Next Meeting, W. C. Alpers, Chairman, submitted the following :

The Committee on Time and Place of Meeting respectfully report that they recommend Lake Minnetonka, Minnesota, as the place, and the first Wednesday in September, 1897, as the first day of our next meeting.

WILLIAM C. ALPERS,  
S. A. D. SHEPPARD,  
W. A. FROST,  
CHAS. T. P. FENNEL.

MR. BURGE: I feel that I ought to do all I can towards securing the meeting of 1897 for the city of Nashville, Tennessee. I have been sent here by the Pharmaceutical Association of that State to present our claims for the next meeting of this Association. We will be in a good condition to receive and entertain the Association next year. We will be in a better condition than we can hope to be for some time, as we will have the Centennial Exhibition open at that time. We can also offer inducements in the way of better railway rates than almost any other place, and our hotel accommodations are as good as will be found in any city in the United States, and the rates at the same time are very reasonable. We have a great many objects of interest in and around our city.

I now wish to offer as a substitute for Lake Minnetonka the name of Nashville, Tennessee, as the place of next meeting.

THE PRESIDENT: We have two reports from the committee on time and place of next meeting, a majority and a minority report.

It was moved by Mr. Hereth and seconded by Prof. Sayre that a vote be first taken as to the place of next meeting.

MR. THOMPSON: The majority, I believe, submitted a report, and the minority offer a report as a substitute. If that is the case, the vote must be first taken on the substitute before the majority report can be brought up.

THE PRESIDENT: The point is well taken.

It was moved by Mr. Chapman, seconded by Mr. Williams, that the minority report be adopted.

MR. PRESCOTT: This brings up the question of the two places, I suppose, and the question is open for discussion. I very cordially support the report of the majority. I think the American Pharmaceutical Association is very happy in having an invitation from so large a constituency, with such great earnestness of spirit, as that given by Minnesota. Being present at the meeting of the Pharmaceutical Association of the State of Minnesota, I had an opportunity of seeing how greatly the pharmacists of the entire State



are interested in this Association, and are being drawn towards membership in this Association through this means. I think it is quite remarkable to see such interest carried over from last year to this year. With regard to the State of Tennessee, I think that any State extending an invitation with such spirit can afford to wait as Minnesota has waited.

MR. REMINGTON: I very much sympathize with Mr. Burge in his efforts to get the Association to meet in Nashville. Mr. Burge is an earnest member from that section, and I know that it cannot be said that he has not done his full duty in inviting the Association to Nashville. It struck me, however, that the arguments he used, or even those he read from the letter, are good arguments in favor of our not going to Nashville. The fact of the exhibition being held there is an argument against our going there. The fact of their being willing to give us what accommodation they can, does not over-ride that argument. We have been at meetings where exhibitions were being held, and we have found that they are a great disadvantage to us in getting hotel accommodation. I very gladly second the remarks of Mr. Prescott. I have been to Minnetonka: it is a beautiful sheet of water, and I hope and trust that we will go there. We will be on neutral ground as regards the twin cities, and we will have the advantage of having a large number of druggists from both places. I think the great point is this: only a few years ago, there were but two members in the Association from Minnesota, and by going there we may gain 100 members, which will mean about \$5,000.00 to this Association if the average length of membership be taken into account. I think we will go to Nashville if Mr. Burge will be patient, but this time I certainly do hope we will go to Lake Minnetonka.

The President having put Mr. Chapman's motion to a vote of the meeting, declared the same lost.

It was moved by W. S. Thompson and duly seconded that so much of the majority report as refers to the place of next meeting be adopted. Carried.

It was moved by Mr. Hopp and seconded by Mr. Remington, that the meeting of 1897 begin on the 4th Monday in August, being the 23d day of the month. After some discussion the motion was carried.

THE PRESIDENT: I would state to the Chairmen of the Committees that we want to call for reports, and if there are any present without their reports, I would ask them to obtain same so that they may be ready when called for.

The Secretary then read the following report, which, upon motion was accepted:

The Committee on Credentials appointed by the Council beg leave to report that they have performed the duty assigned them, and find delegates accredited to this meeting from 56 organizations, as follows:

*Colleges of Pharmacy.*—Albany, Brooklyn, Chicago, Cleveland, Kansas City, Louisville, Maryland, Massachusetts, Montreal, National, New Jersey, New York, Ontario, Philadelphia, St. Louis—15.

*State Pharmaceutical Associations.*—Colorado, Connecticut, Delaware, Georgia, Florida, Illinois, Indiana, Indian Territorial, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, New York, North Carolina, North Dakota, Nova Scotia, Ohio, Pennsylvania, Province of Quebec, Rhode Island, South Carolina, South Dakota, Tennessee, Virginia, Wisconsin—31.

*Alumni Associations of Colleges of Pharmacy.*—Chicago, Maryland, Philadelphia, St. Louis—4.

*Schools of Pharmacy.*—Northwestern University, Purdue University, University of Kansas, University of Michigan—4.

*Local Associations.*—Kings County, N. Y.

*Wholesale Druggists' Association.*—National.

Respectfully submitted,

S. P. WATSON.

CHAS. CASPARI, JR.

DR. WHELPLEY: I move that the Association extend to these delegates hearty greetings, and grant them the privileges of the floor.

The motion was adopted.

The Treasurer then read his annual report, as follows:

# REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1895, TO JULY 1, 1896.

## RECEIPTS.

Cash on hand, July 1, 1895 .....	\$3,284 22
Received from the sale of 6 Certificates, @ \$5.00.....	\$30 00
Received from the sale of 8 Certificates, @ \$7.50.....	60 00
Received from the sale of Proceedings.....	31 69
Received from the sale of Badges.....	31 00
Received from the sale of National Formulary .....	752 12
Received from Interest on Deposit in New England Trust Company, Boston.....	66 71
Received from Interest on Money Invested in Bonds (General Fund) .....	150 00
Received from the sale of boxes .....	7 60
Received from Annual Fees, 1893 .....	\$110 00
Received from Annual Fees, 1894 .....	425 00
Received from Annual Fees, 1895 .....	3,335 00
Received from Annual Fees, 1896 .....	1,445 00
	<hr/> \$5,315 00
Received for Life Membership Fee, viz.: Christian F. G. Meyer .....	6,444 12 10 00
	<hr/> \$9,738 34

## DISBURSEMENTS.

1895.	
July	22. Check 505. John S. Bridges & Co., Miscellaneous..... \$4 00
	22. Check 506. George W. Kennedy, second half year's salary as Secretary of Council, 1894 to 1895..... \$25 00
	Second half year's salary as Secretary of Committee Membership, 1894 to 1895..... 75 00
	<hr/> 100 00
	22. Check 507. Charles Caspari, Jr., Second half year's salary as Permanent Secretary 1894 to 1895..... 375 00
	22. Check 508. S. A. D. Sheppard, Second half year's salary as Treasurer, 1894 to 1895..... 375 00
	30. Check 509. Allen & Co., Printing and Stationery..... 10 50
August	19. Check 510. Charles M. Ford, Chairman Committee on Transportation. .... 60 00

August	19.	Check 511. Evening Chronicle. Printing and Stationery.	\$18 75
	19.	Check 512. John S. Bridges & Co., Printing and Stationery.	18 50
	19.	Check 513. St. Louis Engraving Company, Badges.....	29 40
	19.	Check 514. Charles Caspari, Jr., Printing and Stationery.....	\$17 98
		Miscellaneous.....	9 25
			<hr/> 27 23
	19.	Check 515. Henry Kraemer, Second half year's salary as Reporter on Progress of Pharmacy, 1894 to 1895 .....	375 00
	19.	Check 516. Carl S. N. Hallberg, Section on Education and Legislation .....	19 00
September	23.	Check 517. S. A. D. Sheppard, Traveling Expenses.....	126 50
	23.	Check 518. Charles Caspari, Jr. (Transportation free), Traveling Expenses .....	75 07
	23.	Check 519. C. Lewis Diehl, National Formulary .....	20 00
September	23.	Check 520. Rocky Mountain News Printing Company, Printing and Stationery .....	2 50
	23.	Check 521. John S. Bridges & Company, Printing and Stationery .....	24 00
	23.	Check 522. Alfred R. L. Dohme, Section on Scientific Papers .....	9 54
	23.	Check 523. Henry M. Whelpley, Committee on Membership.	9 25
October	1.	Check 524. Wickersham Printing Company, Formulary .....	\$1 33
		Proceedings .....	4 15
		Printing and Stationery.....	21 95
			<hr/> 27 43
	4.	Check 525. Bert E. Betts, Services as Stenographer .....	50 00
	10.	Check 526. Wickersham Printing Company, Proceedings .....	\$23 93
		National Formulary.....	3 65
			<hr/> 27 58
	10.	Check 527. Henry Kraemer, 1st General Prize .....	75 00
	10.	Check 528. Alfred R. L. Dohme, 2d General Prize.....	50 00
	10.	Check 529. Lyman F. Kebler, 3d General Prize.....	25 00
	11.	Check 530. Bert E. Betts, Services as Stenographer. \$75 00	
		Services as Stenographer for Section on Commercial Interests .....	32 00
			<hr/> 107 00
	21.	Check 531. Lyman F. Kebler, Section on Scientific Papers, for Committee on Indicators, 1894 .....	19 96
November	4.	Check 532. William S. Thompson, Miscellaneous .....	5 00
	9.	Check 533. F. W. Barry, Beale & Company, Printing and Stationery .....	34 70
	9.	Check 534. John S. Bridges & Company, Printing and Stationery .....	6 63
	19.	Check 535. Dennison Manufacturing Company, Printing and Stationery .....	4 00
	21.	Check 536. F. W. Barry, Beale & Company, Printing and Stationery .....	45 35
	29.	Check 537. John S. Bridges & Company, Printing and Stationery.....	3 50

December	7.	Check 538. Wickersham Printing Company, Printing and Stationery .....	\$7 00	
	7.	Check 539. Alpha Photo-Engraving Company, Proceedings .....	14 00	
	12.	Check 540. Evening Chronicle, Printing and Stationery...	18 00	
	17.	Check 541. American Druggist Publishing Company, Proceedings .....	5 00	
	17.	Check 542. Evening Chronicle, Section on Scientific Papers .....	7 15	
	30.	Check 543. Charles Caspari, Jr., Proceedings.... \$9 07		
		Formulary .....	2 01	
		Badges .....	40	
		Insurance .....	15 00	
		Journals for Reporter on Progress of Pharmacy...	13 51	
		Miscellaneous.....	7 00	
				46 99
1896.				
January	27.	Check 544. American Bank Note Company, Certificates...	100 00	
February	12.	Check 545. Charles Caspari, Jr., Journals for Reporter on Progress of Pharmacy .....	\$46 08	
		Insurance .....	6 10	
				52 18
	21.	Check 546. Wickersham Printing Company, Proceedings .....	\$6 11	
		Insurance .....	5 50	
		Miscellaneous .....	12 50	
		Section on Scientific Papers.....	5 00	
				29 11
	21.	Check 547. John S. Bridges & Company, Printing and Stationery .....	3 00	
March	2.	Check 548. American Surety Company, Premium on Treasurer's bond.....	25 00	
	2.	Check 549. S. A. D. Sheppard, first half year's salary as Treasurer, 1895 to 1896 .....	375 00	
	2.	Check 550. S. A. D. Sheppard & Co., Miscellaneous .....	24 69	
	2.	Check 551. George W. Kennedy, First half year's salary as Secretary of Council, 1895 to 1896.... \$25 00		
		First half year's salary as Secretary of Committee on Membership, 1895 to 1896 .....	75 00	
				100 00
	2.	Check 552. C. Lewis Diehl, First half year's salary as Reporter on Progress of Pharmacy, 1895 to 1896 .....	375 00	
	2.	Check 553. Charles Caspari, Jr., First half year's salary as Permanent Secretary, 1895 to 1896.....	375 00	
	5.	Check 554. William C. Alpers, Section on Scientific Papers.	15 33	
	10.	Check 555. George J. Seabury, Section on Commercial Interests .....	200 00	
	20.	Check 556. Wickersham Printing Company, Proceedings..	11 50	
	21.	Check 557. John S. Bridges & Co., Miscellaneous .....	3 50	
	26.	Check 558. Wickersham Printing Company, National Formulary .....	\$611 18	
		Proceedings .....	110 97	
				722 15
April	8.	Check 559. John S. Bridges & Company, Printing and Stationery.....	15 68	

April	8.	Check 560. F. W. Barry, Beale & Company, Printing and Stationery .....	\$47 05
	24.	Check 561. A. B. Prescott, Special Research Committee of Scientific Section .....	75 22
	24.	Check 562. Wickersham Printing Company, National Formulary .....	172 00
May	5.	Evening Chronicle, Printing and Stationery .....	12 50
	14.	Check 564. Wickersham Printing Company, Proceedings .....	\$2374 22
		Committee on Membership .....	5 50
			<hr/>
			2379 72
	14.	Check 565. Wickersham Printing Company, Proceedings .....	\$2 10
		National Formulary .....	10 75
			<hr/>
			12 85
June	11.	Check 566. John S. Bridges & Company, Printing and Stationery .....	13 00
	20.	Check 567. Wickersham Printing Company, Insurance .....	\$5 50
		National Formulary .....	121 52
			<hr/>
			127 02
	20.	Check 568. Wickersham Printing Company, Proceedings..	332 87
	26.	Check 569. Wickersham Printing Company, Proceedings..	487 13
	26.	Check 570. Chas. Caspari, Jr., National Formulary .....	\$30 19
		Proceedings .....	3 86
		Miscellaneous .....	7 23
			<hr/>
			41 22
1895.			
October	14.	Life Membership Fund .....	10 00

Total ..... \$8396 25

The undersigned, a Committee appointed by the Council for the purpose of examining the books and accounts of the Treasurer, have performed the duties assigned them, and have found all entries correct, and the disbursements to correspond with the vouchers.

CHARLES E. DOHME,  
DAVID M. R. CULBRETH, M. D.,  
J. F. HANCOCK.

#### SUMMARY OF DISBURSEMENTS.

July 1, 1895, to July 1, 1896.

Proceedings .....	\$3,384 85
Stenographer .....	125 00
Journals for Reporter on the Progress of Pharmacy .....	59 59
Salaries. Second Half of the Year 1894 to 1895 .....	1,225 00
Salaries. First Half of the Year 1895 to 1896 .....	1,225 00
Premium on Treasurer's Bond .....	25 00
Traveling Expenses .....	201 57
Section on Scientific Papers .....	56 98
Section on Education and Legislation .....	19 00
Section on Commercial Interests .....	232 00
Committee on Transportation .....	60 00

Committee on Membership.....	\$14 75
Special Research Committee of Scientific Section.....	75 22
Certificates.....	100 00
Printing and Stationery.....	324 59
Insurance.....	32 10
Miscellaneous Expenses.....	73 17
Badges.....	29 80
General Prizes.....	150 00
National Formulary.....	972 63
Total amount paid out for current expenses and National Formulary.....	\$8,386 25
Life Membership Fund.....	10 00
Total amount of Disbursements.....	\$8,396 25
Cash on hand, July 1, 1896.....	1,342 09

\$9,738 34

APPROPRIATIONS AND EXPENDITURES UNDER SAME FOR THE FISCAL YEAR JULY 1, 1895,  
TO JULY 1, 1896.

	Appropriation.	Expenditure.
Proceedings.....	\$3,400 00	\$3,384 85
Stenographer.....	125 00	125 00
Journals for Reporter on Progress of Pharmacy.....	60 00	59 59
Salaries.....	2,450 00	2,450 00
Premium on Treasurer's Bond.....	25 00	25 00
Traveling Expenses.....	201 57	201 57
Section on Scientific Papers.....	100 00	56 98
Section on Legislation and Education.....	25 00	19 00
Section on Commercial Interests.....	232 00	232 00
Committee on Transportation.....	60 00	60 00
Committee on Membership.....	25 00	14 75
Special Research Committee of Scientific Section.....	150 00	75 22
Certificates.....	100 00	100 00
Printing and Stationery.....	360 00	324 59
Insurance.....	30 00	32 10
Miscellaneous.....	75 00	73 17
Badges.....	29 40	29 80
General Prizes.....	150 00	150 00
Unexpended Balance.....		\$7,413 62
		<u>184 35</u>
	<u>\$7,597 97</u>	<u>\$7,597 97</u>

PROSPECTIVE ASSETS.

Not counting what is due from members whose names will probably be dropped from the roll at the next annual meeting, and also from members whose residence is unknown, there is now outstanding on the books of the Association:

Annual Dues for 1895.....	\$785 00
Annual Dues for 1896.....	4,265 00
	<u>\$5,050 00</u>

Respectfully submitted,  
*Boston, Mass., July 1, 1896.*

S. A. D. SHEPPARD, *Treasurer.*

Upon motion of Chas. E. Dohme, duly seconded, the report was accepted.

The Permanent Secretary read the following :

# REPORT OF FINANCIAL ACCOUNTS IN THE CARE OF THE PERMANENT SECRETARY.

## A. RECEIPTS AND EXPENDITURES ON ACCOUNT OF NATIONAL FORMULARY FROM JULY 1, 1895, TO JUNE 30, 1896.

### 1. Receipts.

From sales and payment of bills due July 1, 1895..... \$752 12

### 2. Expenses.

Expenses of Chairman of N. F. Com.....	\$ 20 00	
Composition and electrotyping of 208 pages of the revised edition	395 87	
Paper and presswork, 3,000 copies ..	215 31	
Binding 2,000 copies in cloth .....	220 00	
"      50 " " " interleaved .....	9 00	
"      100 " " sheep .....	23 00	
"      100 " " " interleaved .....	30 00	
Copyright fee .....	1 00	
Postage and expressage .....	58 45	
		<hr/> \$972 63

### 3. Remittances.

To Treasurer as per Treasurer's receipts ..... \$752 12

### 4. Sales.

To dealers and individuals as per ledger acc'ts..... \$876 34

### 5. Accounts Unpaid.

By dealers..... \$228 81

### 6. Bills Due by the Association.

All bills contracted to date have been paid.

### 7. Complimentary Copies.

Sent to Congressional Library .....	2 in cloth
"    Pharmaceutical Journals .....	15 "
"    Medical Journals .....	18 "
"    Pharmaceutical Associations .....	45 "
"    Medical Associations.....	53 "
"    Colleges and Schools of Pharmacy .....	31 "
"    Medical Colleges .....	43 "
"    Members of Natl. Form. Committee .....	39 in sheep

Total number of copies sent gratuitously..... 246

Value of complimentary copies at wholesale prices :

207 copies in cloth, @ 66 $\frac{2}{3}$ cents .....	\$138 00
39 copies in sheep, interleaved, @ \$1.00.....	39 00
	<hr/> \$176 00

### 8. Stock on Hand.

Copies in flat sheets .....	750
Copies in cloth.....	622
Copies in cloth, interleaved .....	24
Copies in sheep .....	56
Copies in sheep, interleaved.....	45

**B. SUMMARY OF TOTAL RECEIPTS AND EXPENSES ON ACCOUNT OF NATIONAL FORMULARY SINCE 1888.**

Receipts to June 30, 1895 (see Proc., Vol. 43, p. 26) .....	\$8391	76	
Receipts from July 1, 1895, to June 30, 1896 .....	752	12	
			\$9143 88
Expenses to June 30, 1895 (see Proc., Vol. 43, p. 26) .....	\$5084	75	
Expenses from July 1, 1895, to June 30, 1896 .....	972	63	
			6057 38

### C. SALE OF PROCEEDINGS.

From July 1, 1895, to June 30, 1896.....	\$31 69	
Remitted to Treasurer as per receipts.....		31 69

### D. ACCOUNT OF BADGES AND BARS.

July 1, 1895, on hand as per Secretary's report—Badges.....		35
Bars .....	27	
August 14, 1895, received at Denver .....	49	
	<hr/>	76
Badges sold from July 1, 1895, to June 30, 1896, 9 @ \$2.00 .....	\$18 00	
Bars " " " 2 @ 50 cts. ....	1 00	
20 @ 60 cts. ....	12 00	
	<hr/>	\$31 00
Remitted to the Treasurer, as per receipts .....		31 00
Balance on hand June 30, 1896—Badges .....		26
Bars .....		54
Total receipts from sale of badges and bars to June 30, 1895.....	\$470 10	
Receipts from sale of badges and bars, July 1, 1895, to June 30, 1896 .....	31 00	
	<hr/>	501 10
Total cost of badges and bars to June 30, 1896 (see Proc., Vol. 43, p. 27) .....	\$455 00	
Cost of 49 bars for Denver meeting.....	29 40	
	<hr/>	484 40
Total cash profit.....		\$16 70

CHAS. CASPARI, JR., *Permanent Secretary.*

BALTIMORE, *July* 1, 1896.

Prof. Sayre moved that the Permanent Secretary's report be accepted, it as well as the Treasurer's report having been already approved by the Auditing Committee.

The Reporter on the Progress of Pharmacy, C. Lewis Diehl, read the Introduction to his Annual Report,\* dealing mainly with the questions of pharmaceutical education and legislation. After lengthy discussion, participated in by Messrs. Ebert, Hallberg, Whelpley, Sheppard, Prescott and Bartley, as to the proper disposition of the paper, it was finally accepted and referred to the Committee on Publication.

The Report of the Committee on Membership was read by Geo. W.

\* The Introduction will appear in full further on as a Preface to the Report proper.  
The Gen'l Secretary.



Kennedy, the secretary of the committee, and upon motion accepted and directed to take the usual course.

### REPORT OF THE COMMITTEE ON MEMBERSHIP.

*To the Chairman and Members of the Council of the American Pharmaceutical Association:*

*Gentlemen:* In obedience to requirements of the Association, as secretary of the Committee on Membership, I herewith submit my annual report. Shortly after adjournment of the forty-third annual meeting, which was held in Denver, Colorado, last year (1895), your secretary attended promptly to the duties of his office, by sending the customary invitation to each gentleman who was invited by the Association to perfect his membership by signing the regular blank form of completion of membership, which was mailed at the same time. Two hundred and forty-three members were recommended as proper persons to become members of our organization in compliance with the By-Laws: of this number one hundred and forty-one (141), about 58 per cent. of those proposed and invited to complete their membership, have done so and their names are now on the roll as active members. The per centage of those who were recommended and who subsequently completed their membership, is much smaller this year than last, and in fact for several years back, which is no doubt due, principally, to the careless manner in which names are presented for membership. Take for example the state of Colorado, where the Association met last year; forty names were proposed of persons residing in that state, and but five of these, one in every eight, made their membership good. We certainly should have had better returns, especially after calling applicants' attention to the matter several times. Finding that a similar condition of things existed elsewhere, and that many of those proposed at the Denver meeting were slow in completing their membership, in response to my notification and invitation, I corresponded with a number of the Auxiliary Committee, suggesting that they write to the gentlemen whom they proposed, with a view of getting them to complete their membership. In some cases the result was very satisfactory, while in other cases it was very unsatisfactory.

The new members represent nearly all sections of the country, as they are credited to thirty-seven (37) States, the District of Columbia, and Canada. Since the Proceedings for 1895 have been issued, the following lady and gentlemen, whose names do not appear on the rolls, have become members: Ray Humiston, Worthington, Minn.; J. M. Colburn, Little Rock, Ark.; Otto Boeddicker, New York; Wm. D. Brace, Washington, D. C.; Edward Shumpik, Minneapolis, Minn.

The Treasurer, Mr. S. A. D. Sheppard, has reported to your Secretary that on July 1, 1896, 209 members were liable to be dropped from the rolls for non-payment of dues, they being three or more years in arrears. The names of many on this list, I fear, will be removed, unless their indebtedness is liquidated by the time the next volume of the Proceedings is issued. This is an unusually large number—in fact, the largest number ever reported to your Secretary, resulting, I presume, from the depression of business all over the country. Only one man became a life member during the fiscal year. Both the Special Auxiliary Committee appointed by the President, and the regular Standing Committee on Membership, have labored indefatigably during the past year, procuring desirable members. Whether they will be properly rewarded for their labors I am not prepared at this writing to say, but the outlook at this time compares favorably with other years, and the indications point to a good increase.

#### *Report of Membership.*

Active or contributing members in good standing at last report.....	1,435
Members elected since last report.....	141.

Total .....

1,576

*Loss in Membership (active).*

By transfer to life membership list .....	1
By resignation.....	25
Dropped from roll for various causes .....	83
By death.....	19
	<hr/>
Total loss .....	128
	<hr/>
Members on the roll at this report .....	1,448

*Life Membership.*

Number on the roll at last report .....	98
Number added since last report.....	1
	<hr/>
Total .....	99

*Loss in Life Membership.*

By death .....	4
	<hr/>
Number on the roll at this report .....	95

*Honorary Membership.*

There was no increase or decrease during the year, the number therefore remains the same .....	15
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*Total Membership.*

Active or contributing members .....	1,448
Life members.....	95
Honorary members.....	15
	<hr/>
Total.....	1,558

I had hoped that a kind Providence would have spared me the painful duty of adding so many to the already long list of those who have finished their work and gone to receive their reward. But the solemn fact that not a single year passes by that does not mark the fall of some of our number by the hand of the silent Reaper, admonishes us that he is no respecter of persons, and that the time must come, sooner or later, when our seats shall be vacant and our voices silent. During the past year we have been called upon to notice the demise of twenty-three of our number, as follows:

J. Brown Baxley, Baltimore, Md.	Harlan P. Kendrick, Barre, Vermont.
Henry Bower, Philadelphia, Pa.	Edward F. Keasler, Louisville, Ky.
Charles O. Curtman, St. Louis, Mo.	Asahel H. Lyman, Manistee, Mich.
Henry H. Hay, Portland, Me.	George J. Mattingly, New Orleans, La.
Charles E. Haenchen, Philadelphia, Pa.	John A. Milburn, Washington, D. C.
Charles K. Hall, New Orleans, La.	Luzerne I. Munson, Waterbury, Conn.
Claude C. Hamilton, Kansas City, Mo.	John M. McNeil, Scottsdale, Pa.
J. Niven Hegeman, New York City.	Henry S. Physick, St. Louis, Mo.
James S. Higgins, New York City.	William Rust, New Brunswick, N. J.
Charles Hohley, Toledo, Ohio.	Peter I. Spenser, Cleveland, O.
N. Hynson Jennings, Baltimore, Md.	John P. Taylor, New Bedford, Mass.
Lawrence W. Kadlec, Chicago, Ill.	

*J. Brown Baxley*, Phar. D., one of the oldest and most reputable pharmacists of Baltimore, Md., died at his late residence, 1531 Madison avenue, that city, March 30, 1896, in the eighty-second year of his age. He it was who suggested an organization of

pharmacists in 1841, which resulted in the organization of the Maryland College of Pharmacy, and he was the leading spirit in pharmaceutical legislation in Maryland in 1868, giving the subject his untiring efforts until success was achieved in 1870 by the General Assembly of Maryland enacting a law to be locally applied to the city of Baltimore; he being the first appointed commissioner and the first president of the Maryland Board of Pharmacy. He served the college in various positions, being always faithful to his trust. He was for a short time its president and for many years its treasurer. Whatever duty he accepted, was to bestow upon it all the power of his mind and body. He was born in Baltimore and educated at St. Mary's Seminary. When a youth of seventeen he went to Philadelphia and there studied pharmacy. He afterwards went south, and for ten years conducted a drug store in Mobile, Ala. In 1840 he returned to Baltimore, and for many years conducted a pharmacy at the corner of Howard and Franklin streets, removing to Madison avenue and McMechen street in 1877, where he established himself under the firm name of J. Brown Baxley & Son. He retired from business three years ago, his health being too feeble to continue it any longer, his son, Dr. Henry M. Baxley, who was associated with him in business, having studied medicine after the pharmacy was sold. Mr. Baxley took great interest in the Baltimore General Dispensary, where he was employed as apothecary when a young man. He was twenty-eight years its president, holding that position at the time of his death. He was a life member of our Association and its Treasurer in the years 1863 to 1865. Deceased became a member of our Association in 1856, at the meeting held in the city of Baltimore.

*Henry Bower*, a prominent manufacturing chemist, after three weeks' lingering illness, died Thursday, March 26, 1896, at his home, 130 South Twenty-third Street, Philadelphia, Pa., at the age of sixty-three years. He pursued the course of study at the Philadelphia College of Pharmacy, graduating 1854. Following his graduation he entered business as a chemical broker, and later engaged as a manufacturer of chemicals. In 1886 he took his son William H. Bower into partnership with him, the firm name being changed to Henry Bower & Son. The following year the firm was dissolved, and two stock companies incorporated—the Ammonia Company of Philadelphia, of which Mr. Bower was general manager, and the Kaolin Chemical Company, of which he was secretary. Mr. Bower was considered an excellent authority on all subjects relating to the manufacture of chemicals, and in 1880 and 1890 he was an agent of the Census Bureau for the collection of statistics of the Chemical Industry. Several years ago he received the Elliott Cresson Medal from the Franklin Institute for the process for the utilization of crude glycerine. The medal is of gold, and is the most valuable one ever awarded by the Institute. Mr. Bower also prepared a number of articles on chemical subjects. He was an active member of the Franklin Institute and one of the Board of Managers. He was also for a long time secretary of the Manufacturing Chemists' Association of the United States. Deceased was one of the oldest members of our Association, having connected himself with it in 1860, at the meeting held in the city of Philadelphia.

*Dr. Charles O. Curtman*, of St. Louis, Mo., died at his residence, 3718 North Ninth street, April 22nd, 1896, after a brief illness, of heart disease, superinduced by the grippe. Dr. Curtman was a scientist and chemist of national reputation, and his loss will be profoundly regretted. It will also create a void which few living men could fill. As professor of chemistry at the Missouri Medical College, Dr. Curtman was the trainer of many of the brightest minds in the profession, and his lectures and experiments were famed throughout the country. Dr. Curtman was in his sixty-seventh year, and was a native of Giessen, Hesse-Darmstadt. He came to America when seventeen years old, remained for a while in New York city and later in New Orleans. In 1859 he settled in Memphis as a druggist. In 1866 he settled in St. Louis, taught chemistry in the old McDowell College at Eighth and Grattan streets, and began the study of medicine, which

he afterwards practiced with success. It was, however, in the intricacies of chemistry that he made his success and great reputation. McDowell College subsequently changed its name and location and became the Missouri Medical College. Dr. Curtman also occupied the chair of chemistry at the St. Louis College of Pharmacy. His son George, by his first wife, is now a practicing physician at St. Thomas, Mo. By his second wife he had a family of three daughters and one son. Dr. Curtman was the author of a number of works; his "Analytical Chemistry," and his "Lecture Notes" are to-day text books in many of the best colleges in the country. He was also analytical chemist for the Mallinckrodt Chemical Works of St. Louis. Up to the last Dr. Curtman was himself a student. Despite his advanced years he kept fully up with and even in advance of the times. The X ray discovery greatly interested him, and his experiments with it before his class, only a few weeks prior to his death, were both startling and beautiful. The doctor was one of the most companionable of men. While ever studious and thoughtful, he never lost an opportunity for a pleasantry when in social conversation. "Curtman's jokes" were characteristic and all the more enjoyable on account of coming unexpected from one with such stupendous and busy mind. His eyes were veritable mirrors of life, and sparkled with an intellectual radiance that charmed every one. A glimpse at Dr. Curtman's home life was truly ennobling. He was husband, father, counsellor, teacher and companion to the family. He was an ever solicitous and kind domestic man, making for his children "no place like home;" thus it is that even his most intimate friends cannot realize the full significance of the bereavement to the wife, daughters and sons. The news of his death cast a gloom over the entire medical and pharmaceutical professions, and especially over the faculties of the Missouri Medical College and the St. Louis College of Pharmacy. The faculties met and took action on the death of their honored and departed brother. Deceased became a member of our Association in 1871, at the meeting held in St. Louis, Mo.

*Henry Homer Hay*, of Portland, Me., died August 9, 1895. He had been in a feeble condition for some time, but his illness did not take on a serious form until within a fortnight before his death. He was confined to his bed but a week, and within that time the end was not unexpected. Mr. Hay was the son of Dr. Charles Hay, who practiced medicine in Cape Elizabeth during the War of 1812, afterward removing to Waterford, where Mr. Hay was born October 26, 1820, the youngest of twelve children, of whom his brother George S., of Portland, is the sole survivor. His family moved to Portland in 1828. After attending the public schools, Mr. Hay became a clerk for a short time in a grain store, but at seventeen years of age he entered the drug, paint and dye stuff establishment of Masters & Co., subsequently T. R. Hayes & Co., located at 230 Middle St. In 1841, he entered into business with the late Robert Dresser, under the firm name of H. H. Hay & Co., to carry on the wholesale paint and drug business at 377 Fore street. Two years after forming his partnership with Mr. Dresser he sold out to his partner and purchased W. W. Lincoln's stock and fixtures at 14 Market (now Monument) Square. In 1856, he removed to the present store, formed by the junction of Free and Middle streets. Here Mr. Hay remained until the time of his decease, having taken his sons Charles and Edwin into partnership. Mr. Hay was twice married, his first wife being Josephine, daughter of the late Calvin Gilman, by whom he had one child. His second wife, who survives him, was Eleanor Seary, daughter of the late Marian Seary. The six children by this marriage are all living. He was a member of the Portland Paint and Oil Club, the New England Paint and Oil Club, and the National Wholesale Druggists' Association. He naturally, by the law of heredity, took up the handling of medicine, his father, grandfather and great-grandfather, all having been physicians. Deceased was a life member of our Association, having joined the organization in 1867, at the meeting held in the city of New York.

*Charles E. Haenchen* was born in Gauersheim, Prov. Bavaria, Germany, January 20.

1831. In 1844 he began the study of pharmacy; he graduated from the University of Erlangen in 1855, and from the University of Strassburg in 1863, from which place he went to England and entered a pharmacy, where he remained some time, and subsequently returned to Havre, France, where he passed an examination as surgeon, and received the appointment as surgeon on a ship to America. Arriving in Philadelphia, securing a good position, he remained in this city a few years, and then removed to Boston. After spending some time in Boston, he returned to Philadelphia in 1867, and went into business for himself by purchasing the store cor. 9th and Noble, which he disposed of two years later. In the winter of 1871 he opened a new store at 3844 Haverford avenue, West Philadelphia, where he continued business up to the time of his death. Deceased died October 11, 1894, of heart disease. He became a member of our Association in the city of Boston in 1865.

*Charles K. Hall*, of New Orleans, died December 27, 1894. Deceased was born in New Orleans, La., March 25, 1852. In early life his tuition was obtained in a private family academy in his native city, and continued in France at the Lyon Imperial. He afterwards entered the Washington and Lee University of Virginia, whence he graduated. While yet a young man, he achieved success in commercial life in Texas, after which he returned to the city of his nativity, and entered the firm of Messrs. E. J. Hart & Co., with whom he subsequently became associated in partnership. He joined the Louisiana Pharmaceutical Association in 1887, and placed himself in hearty accord with it, and was also a member of the Orleans Pharmaceutical Association. We recall with pleasure the successful consummation of his labors as chairman of the Committee on Exhibition at the meeting of our Association in New Orleans in 1891. The personal characteristics of Mr. Hall were peculiarly attractive. His was a truly genial nature, and his corps of friends included people from all the walks of life. He was a public-spirited man and did much to develop and encourage the resources of his native city. He organized the Louisiana Furniture Company, and served as its president up to the time of his death. He was also president of the Dawson Perfumery Company. Being of a truly domestic nature, his greatest happiness was in the society of his family, to whom he was devoted. A wife and two daughters survive him. Mr. Hall became a member of our Association in 1887, at the meeting held in Cincinnati, Ohio.

*Claude C. Hamilton*, of Kansas City, Mo., died on Tuesday, March 10, 1896. His death was not unexpected, as he had been a sufferer from tuberculosis for about two years, but it was not until last December that he was compelled to give up his work at the college, on account of the rapid encroachment of the disease. Dr. Hamilton's short life was one of fruitful achievement and proud distinction. Although but thirty years of age at the time of his death, he had already gained a wide reputation as a scientist in this country and abroad. The study of chemistry, which delighted him in his boyhood, became the ruling passion of his late career, and he came to be an author, a teacher and an investigator of high repute in his chosen line. Having received a college education, he entered upon the joint study of pharmacy and medicine, and in 1889 was graduated from both the University Medical College and the Kansas City College of Pharmacy. The former institution, always keen to discern in her sons the indications of promise and ever solicitous for their welfare, so interested herself in his behalf that he obtained early preferment. The same year he was appointed demonstrator of pharmacy in both institutions, and from that time on his rise was more than gradual. He became president of the College of Pharmacy, professor of chemistry in the University Medical College, and in the Dental and Veterinary Colleges, and fellow of the Society of Chemical Industry, an English society which ranks as the highest of its class in the world. But those who knew Dr. Hamilton best knew him to be something more than a scientist; they knew him to be a man of deep convictions and high sense of duty. They felt the impulse of his example and were comforted by his broad sympathy. No student was ever turned

away, even in his busiest hours, without a hearing; and even if he found it impossible to accede to all their wishes, his refusals were such as to appease rather than disappoint. His sense of duty, like that of all great-souled men, led him to forget himself in his work for others. He scorned the suggestion of danger. He looked beyond the process to the product. And those who profess to know, and whose word we cannot doubt, say that it was his fidelity to duty that brought him to his early grave. His incessant work, his unremitting confinement, his constant exposure to the factors in the production of disease, at last shook down the gates to the strongholds of life, and he died as do those who give their lives for others. Dr. Hamilton became a member of our Association at the meeting held in Chicago in 1893.

*J. Niven Hegeman*, who died at his summer home, at Irvington on the Hudson, N. Y., on November 12th, of paralysis, was born in New York, in 1843, and was thus aged 52 years when he died. With him passes away the second generation of druggists of that name. He was a grandson of the late Judge Adrian Hegeman, who was a judge of Common Pleas Court of New York, and was also a descendant of one of the original Dutch aldermen of Manhattan Island. He was great-grandson on his mother's side of Colonel Niven of the Revolutionary Army. Young Hegeman was educated at the Charlier Institute, long situated at Fifty-ninth street and Sixth avenue, but now out of existence. Soon after graduating he entered his father's employ and undertook extensive travels in the interest of the firm, visiting every part of the United States, in days when travel was not the luxury it is now, and when merchandise had to be carried in wagons and on mule-back many long miles. He always looked back to this part of his career with peculiar pleasure, as it initiated a series of friendships from ocean to ocean, many of which were retained to the last. Soon after his return he married the daughter of Governor Fenton, and bought a handsome residence in Orange, N. Y., busying himself meanwhile with the five stores controlled by the firm. Soon after the death of his father, in 1873, he was stricken with a malady which completely incapacitated him for business, and partly through this and the failure of several large concerns owing him large sums of money, he succumbed to the financial stress of the middle 70's. When he had recovered his health sufficiently to enable him to resume his business cares, he found himself with little to start afresh with, but re-purchasing the store at 756 Broadway, which together with the others had slipped from his grasp in the crash, he soon, by his indomitable push and vigor, surrounded this, the nucleus, with other stores, until to-day the corporation of which he was president owns four stores in prominent thoroughfares. Deceased was secretary of the New York College of Pharmacy, holding this office at the time of his death. In addition to his membership in various scientific societies, Mr. Hegeman was a member of many prominent clubs and associations, but owing to the demand made upon him from other sources, he relinquished all but the college of pharmacy and the Holland Society. His death was unexpected, though for months past disease had been slowly creeping upon him. He hoped to stave off its approach by rest, but he rested too late. Mr. Hegeman was a magnetic conversationalist, a good friend, an aggressive antagonist, shrewd as a buyer, liberal yet careful as a seller, and one who never favored the pernicious and demoralizing practice of "scalping" and "cutting," now so much in vogue. In the Druggists' Union, formed some years ago to fight this evil, he was a leading spirit, and was one of the last to uphold the dignity, prestige and profits of those represented in that body. Among those who will miss the genial presence of deceased, none will feel the loss more keenly than the representatives of the pharmaceutical press, all of whom will join in testifying to his many admirable traits of character. Mr. Hegeman became a member of our Association in 1880, at the meeting held in Saratoga Springs, New York.

*James S. Higgins*, of New York, died April 8th, 1896, of pneumonia, within three weeks after the death of his wife from the same disease. He was proprietor of a drug

store at the corner of Lexington Avenue and 11th St., at the time of his death, but had been located there only about two years. For twenty-five years before removing uptown he had conducted the store at the corner of Pitt and Delancey Streets, New York. Mr. Higgins was sixty years of age. He was a native of Bordentown, N. J., but lived in New York from his twelfth year, at which time he began to work in a drug store. He married a New York lady of German parentage, Miss Helene Lennig, by whom he had two daughters—Mrs. Chas. Haenesler, who is a graduate of the New York College of Pharmacy, and before her marriage worked behind her father's prescription counter for years. and Mrs. E. H. Merritt, whose husband is manager of the Kalish Pharmacy Company, 100 East 23rd street. The funeral was held at the house of the former daughter. Mr. Higgins was a member of many societies, including the New York College of Pharmacy. Mr. Higgins became a member of our Association in 1862 at Philadelphia.

*Charles Hohley*, one of the oldest and best known druggists in Toledo, Ohio, died at his residence, 602 South St. Clair street. Mr. Hohley was a highly respected citizen and his death is mourned by many. The deceased was a sufferer from Bright's disease, and his death was not unexpected. He was born in Neuenstadt, Wurtemberg, in 1839. In 1853 he, with his parents, emigrated to America. From 1854 to 1857 they made their home in Toledo, where his father practiced medicine. In 1857 the family went to Superior, Wis., where for five years deceased assisted his father in a drug store, going to Chicago in 1862, where he was engaged in several drug stores. He returned to Superior in 1866, which latter place he left in March, 1867, and settled permanently in Toledo. Here he established a store with his father, who died in 1870. The firm name was C. Hohley & Co., and the business was carried on at 602 South St. Clair street until his death. In April, 1875, Mr. Hohley was married to Phoebe E. Reed, daughter of Geo. Reed and sister of Dr. C. H. Reed of Toledo. His married life has been blessed with four children, three sons and one daughter, who, with their mother, survive him. Mr. Hohley became a member of our Association in 1872 at Cleveland, Ohio.

*N. Hynson Jennings*, one of the most prominent druggists of Baltimore, died at the residence of his son, near Easton, Talbot County, July 5th, 1896. His death proved a shock to his large circle of friends and professional brethren. On all sides were heard expressions of sincere regret, attesting the high esteem in which he was held. No man in Baltimore was more respected as a man for his attainments than Mr. Jennings, who had conducted the Charles street pharmacy for forty-two years, and had an enviable reputation for probity and fair dealing. He belonged to the old school of druggists, now being rapidly reduced in number, and found it rather difficult to adapt himself to the new order of things. During late years he had not enjoyed good health, but kept pluckily on attending to business until increasing infirmities made it impossible for him to do so. He was then taken to the Talbot County farm in the hope that country air and freedom from worry would aid recovery. But vitality had become too much reduced, and after about six weeks Mr. Jennings succumbed. He was sixty-seven years old, a native of Virginia, and a member of the Maryland Pharmaceutical Association and of the Maryland College of Pharmacy, the latter of which he helped to found. Mr. Jennings left three children, one son and two daughters, his wife having died about three years ago. The remains were interred in Loudon Park Cemetery. Delegations from the Pharmaceutical Association of Maryland and the Baltimore College of Pharmacy attended the obsequies. Deceased became a member of our Association in 1857, at the meeting held in Philadelphia, and was elected second vice-president in 1867.

*Lawrence W. Kadlec* was born at Uboe, Bohemia, Europe, in the year 1853. While in Bohemia he received a good education, having attended a gymnasium there up to his nineteenth year. He became well versed in the Latin, Greek and French languages. He then left for America and worked in a drug store in Chicago, where he, about the year 1874, established himself on West Twelfth street near Canal. He soon became

quite prosperous, and in later years opened a branch drug store on the corner of Eighteenth street and Centre avenue. Soon after establishing his own drug store he began to grow popular among his own countrymen and became quite prominent. Mayor Harrison made him twice a member of the Public Library Board. He was a member of the Chicago College of Pharmacy and had served as a trustee of this institution. Instance upon instance might be cited showing what power he experienced and what degree of respect he commanded among the Bohemian citizens of Chicago. One worthy of notice is the office of Chief Marshal on the Bohemian Day of the World's Fair. Among his many achievements in the social line, his service as the Grand Protector of Knights and Ladies of Honor of the State of Illinois, up to his death, is certainly worthy of mention. He was an active member of the Illinois Pharmaceutical Association and gave considerable of his time in advancing the profession of his choice. His family life was a happy one. Nineteen years ago he married Miss Anna Kolar, the fruit of which union was five children, three of whom, Clara, Harry and Edwin, are now living, the eldest being thirteen and the youngest six years of age. Deceased took unusual pride in his profession and had one of the most convenient and best arranged stores in Chicago. He was a very strict disciplinarian, having formulated a series of rules for the conduct of his employees and for "the running of the store," some of which, while a trifle arbitrary, indicated the careful and scrupulous exactness of the man's character. Mr. Kedlac became a member of our Association in 1880, at the meeting held at Saratoga Springs, New York.

*H. P. Kendrick*, of Barre, Vermont, was born in Lebanon, N. H., October 29, 1848, and lived with his father until he was married in 1872. He was in different kinds of business, and at the early age of fourteen years, had charge of a grocery store for nearly two years which he ran himself, the proprietor being sick during this period. Subsequently he began the study of pharmacy, and in 1870 started a drug store of his own in the town of Lebanon, where he remained until the fall of 1887, when he sold his store and went to Southern California, where he remained until the following spring. He then returned and went into business with a Mr. Kimball as a partner in Barre, Vermont, in the spring of 1890. This partnership lasted about two years, when Mr. Kimball retired and Mr. Kendrick conducted the business until his death, which occurred November 5, 1895, he being sick about four or five months with dropsy. Deceased was married and leaves a widow and three children to mourn their loss, as he was a good, kind father and husband. He was buried in his old home in Lebanon, N. H. Mr. Kendrick became a member of our Association in 1894, at the meeting held in Asheville, N. C.

*Edward F. Kessler* was born in Oberlistingen, Hesse-Cassel, Germany, forty-seven years ago. He was the son of Frederick Kessler, a preacher of the Lutheran doctrine. His father was a highly-educated man and he took great pride in the education of his son. He assisted him in the learning of several foreign languages, sending him when he reached the age of fourteen to the Frederick William Gymnasium, at which school he graduated at the age of eighteen years. When he had finished at this school he was undecided whether to take up the study of theology or medicine. In the meanwhile his father died, and having his mother and a sister to look after, he gave up both professions, and shortly afterwards came to this country with Mr. Adolph Pfingst, of Louisville, Ky., who happened to be visiting in Germany. During the first fourteen years of his residence in Louisville he was in the drug business. He clerked for Mr. Ferdinand J. Pfingst, who kept a drug store on Twentieth and Market streets for a number of years, and finally was taken into partnership. When some years later, in 1880, Mr. Pfingst embarked in the tobacco manufacturing business, Mr. Kessler was induced to take an interest. The firm was known by the title of Pfingst, Doerhoefer & Co; afterwards became incorporated, and was known as the "National Tobacco Works," doing business on Eighth and Main streets; later it was again incorporated and sold out to the "American Tobacco Company," constituting the Louisville branch of that corporation. The services of Mr. Kes-



sler, who became manager of the office department under the new corporation, were considered very valuable on account of his knowledge of chemistry and his ability as a statistician. He died on Friday, October 12, 1895, a wealthy man, honored in the community in which he lived for his integrity and sterling character, and mourned by numerous friends and relatives in Louisville and in Indianapolis. Deceased was married, leaves a widow but no children to mourn his loss. His connection with our Association dates back from the meeting held in Indianapolis, Ind., in 1879.

*Asahel H. Lyman*, of Manistee, Mich., died there after a short illness. Mr. Lyman was an educated pharmacist, having received a good education before he began the study of pharmacy. He served a regular term as an apprentice to the business, after which he went into business for himself and continued the same in Manistee for many years and up to the time of his death. Mr. Lyman was a man well thought of in the community in which he resided, as an honorable gentleman. He took considerable interest in the drug business, and it was his delight to raise its standard. Deceased became a member of our Association in 1884, at the meeting held in the city of Milwaukee, Wisconsin.

*George James Mattingly*, of New Orleans, La., died there July 19, 1895, of which place he was a resident for nearly half a century. Mr. Mattingly was born in Richmond, England, sixty-two years ago, and emigrated to this country when quite a small boy. He began the study of pharmacy in New Orleans, and after receiving a thorough education in the business, and being fully competent to assume the responsibilities of proprietor, he began business on his own account in 1861, successfully conducting the same up to the time of his death. Mr. Mattingly was considered an accomplished apothecary and was held in high esteem by the community in which he resided as an honorable pharmacist and a good citizen. Deceased was one of the founders of Louisiana State Pharmaceutical Association, and took considerable interest in its progress from its organization and up to the time of his demise. Mr. Mattingly became a member of our Association in 1891, at the meeting held in the city of New Orleans, La.

*John A. Milburn*, who for many years was one of the best known druggists in Washington, D. C., died at his residence 1122 13th street. He was in his sixty-fifth year, and for the larger part of his long and busy career he was actively identified with the business interests of Washington. His death will be felt as a personal loss by many outside of his immediate family. Mr. Milburn was born December 20th, 1830, in Alexandria, Va., where his father was known as a successful potter. At the age of seventeen years he first entered the drug business with Mr. Henry Cook and later with Mr. Z. D. Gilman of Washington. In 1851 he engaged in business on his own account at the corner of King and Washington streets, Alexandria, and five years later his brother, J. Parker Milburn, opened a drug store under Willard's Hotel, in which he was a partner. In 1860 Mr. Milburn disposed of his business in Alexandria and moved permanently to Washington and became actively engaged with his brother in the Avenue Pharmacy. Later on the Milburn Brothers moved to 15th street, and subsequently they leased the ground and erected the building No. 1429 Pennsylvania avenue, where he continued until 1889. During part of this time, in partnership with F. M. Criswell, he carried on a drug store at the corner of 11th and F streets. In 1887 he retired from active business, in which he had been so successful, but he never lost a bit of his interest in pharmacy. He was one of the founders of the National College of Pharmacy in 1872, and was its president from 1877 to 1879. For fifteen years he was the treasurer of the College, and to him was largely due its financial success. Mr. Milburn was interested in many of the enterprises which tended to promote the city's growth and prosperity. He was a director of the Arlington Fire Insurance Company, and was also one of the incorporators of the Children's Hospital. He was a man of kindly disposition, and his charities were many and numerous. Deceased was a life member of our Association, having joined our organization at the meeting held in Washington, D. C., in 1858.

*Luzerne I. Munson*, of Waterbury, Conn., died at his home October 28, 1895, after a short illness, of stomach and bowel trouble. The birthplace of Luzerne Ithiel Munson was Wallingford (Northford society), and the date March 1, 1838. He was a son of Titus Munson, and attended the common schools and received such an education as they afforded. Then he was for two years a student at Durham Academy. He was sixteen when he went to Waterbury in 1854, and entered the employ of the Apothecaries' Hall Company, which had been organized five years before by Dr. G. L. Platt. Dr. Platt had associated with him Dr. Henry L. Fish, one of the most experienced pharmacists in the state; the training Mr. Munson received under these gentlemen could not be better. In 1861, Mr. Munson left the Apothecaries' Hall Company and became shipping clerk and book-keeper for the City Manufacturing Company. A year later Mr. Munson moved to Meriden and became secretary and treasurer of Julius Pratt & Co., and later was secretary and treasurer of Pratt, Reed & Co., a consolidation of the first-named company and two others. Mr. Munson remained in Meriden but a short time, and then in 1863, when only twenty-five years old, returned to the Apothecaries' Hall Company, which he had left two or three years before. Dr. Fish moved to New York in 1864, and Mr. Munson succeeded him as manager of the company, which position he held until his death. The deceased was one of the original members of the Connecticut Pharmaceutical Association, was for one year its president, and for several terms chairman of its executive committee. He was closely identified with everything that was advanced in his business, and by close application built into an immense enterprise the corporation of which he was the head. Fortunately, he was able to see gratified his ambition in the magnificent building which in one sense will be a monument to the man who is now gone. Mr. Munson married in 1861 Mary Bronson, daughter of the late Archibald E. Rice, and leaves in addition to his widow, two daughters, Mary Edna and Sara Rice. Deceased became a member of our Association in 1872, at the meeting held in Cleveland, Ohio.

A few minutes after midnight, on Friday, March 6, 1896, the death messenger came to *J. M. McNeil*, and relieved his spirit after months of suffering the torture of sciatic rheumatism, taking from their midst one of the most popular and well-known business men of Scottdale, Pa. Mr. McNeil was born at Delmont, Pa., May 7, 1859, hence he was within a few months of forty years of age at the time of his death. He went to Scottdale in 1880 and engaged in the drug business with T. F. Cummings, in the room now occupied by Grazier, the tailor. The partnership lasted a little over a year, when Mr. McNeil established the Broadway drug store, which he has owned and conducted ever since October 19, 1882. He was united in marriage with Miss Sadie Pinkerton, of Parnassus, who, with a little daughter, survives him. During the summer of 1894 Mr. McNeil's health began failing, and in November of the same year he was seized with sciatic rheumatism, which finally resulted in his death, in spite of everything that medical treatment and changes of climate could do to counteract the disease's ravages. Deceased became a member of our Association in the year 1882, at Niagara Falls, N. Y.

*Henry Sanford Physick* died in St. Louis, Missouri, March, 1896, after many years' experience as city salesman for St. Louis wholesale drug firms. He was born in England in 1840, and served as Surgeon's Steward for several years. In 1865 he became city salesman for the Richardson Drug Company of St. Louis, remaining with them until the fire which consumed that firm's establishment. He then went to the Moffitt-West Drug Company until the organization of the Daugherty Crouch Drug Company, with which firm he remained until it was absorbed by the Meyer Brothers Drug Company. He remained with the latter firm until January 1st of the present year, when he embarked in the drug business at Middletown, Missouri. Mr. Physick was one of the most accommodating salesmen, and had many personal friends in the trade. He was an educated pharmacist and understood the business thoroughly. He was an active member of the Missouri State Pharmaceutical Association, and became a member of our organization in Baltimore city, Md., in 1870.

*William Rust*, who died at his home in New Brunswick, N. J., on Saturday August 31st, 1895, was one of the oldest citizens of that place and a widely known and much respected pharmacist. His death was doubtless due to old age and its attendant ailments. Mr. Rust was born in New York City on November 29th, 1810. Early in life he started in the drug business, and was a wholesale druggist for twenty years in New York City prior to his moving to New Brunswick. In 1854 he established the business which he has since conducted in New Brunswick. It is an extensively known house, occupying a large plant at Peace and Burnet streets, and has always carried on a large business, both wholesale and retail. Of late years, two of Mr. Rust's sons have been associated with their father in the firm. The house has patented and manufactured several medicines and toilet preparations. When the New Jersey Pharmaceutical Association was organized Mr. Rust was chosen its treasurer, and served in that office for nineteen years. He was active in the religious, social and financial life of New Brunswick. In 1870, at the meeting held in the city of Baltimore, deceased became a member.

*Dr. P. I. Spenser*, a well known Cleveland, Ohio, druggist, died in that city of heart disease, April 27, 1895. Dr. Spenser was born in Württemberg, South Germany, in 1827. At the age of fourteen he was left an orphan, and in 1854 he came to the United States. After having acquired the English language he entered upon the study of pharmacy in the botanic and eclectic drug store of Drs. Parker & Butler, of Cleveland, in 1856. He continued the study of general pharmacy with Hugo Hensch, at that time one of the ablest pharmacists in northern Ohio. In 1863 he became manager of a pharmacy, and in 1865 entered into partnership with Louis Smithnight, under the firm name of Smithnight & Spenser, where he remained until the summer of 1869, when he embarked in business alone. He commenced the study of medicine in 1870 at the Medical Department of Wooster University, graduating in the spring of 1873. Since that time he devoted most of his time to medicine, though he always retained possession of the drug store at 368 Central avenue, now managed by one of his daughters, Miss Mary H. Spenser. Deceased was an active member of the Cleveland and Ohio State Pharmaceutical Associations. He became a member of our Association at the meeting held in Cleveland in 1872.

*John P. Taylor*, of New Bedford, Mass., died of pneumonia at his home, November 16, 1895, aged sixty-five years and ten months. Mr. Taylor was born in New Bedford, January 4, 1830. He commenced business as an express messenger with Hatch & Co., and afterwards was in the express business for himself. For four years he was with Charles Pratt & Co., oil manufacturers, of New York. In 1871 he became proprietor of the drug store at the corner of Amherst avenue and Bedford street, where he has since been engaged in business. Mr. Taylor was a member of the Common Council from Ward Six during the administration of Abraham H. Howland, Jr., in 1875 and 1876, and under Alanson Borden in 1877. He was an alderman under Mayor William T. Soule in 1880 and under Mayor Geo. Wilson in 1884. He was also a member of the Board of Overseers of the Poor at one time, and was one of the founders of the Iron Spoon and Tiller Clubs. Deceased was held in high esteem by the citizens of his native city. He became a member of our Association in 1875 at the meeting held in Boston, Mass.

In closing this my twenty-second annual report, I desire to return my thanks to all officers and members of this Association, who so kindly assisted me when information was needed. Your Secretary would consider it a great favor if members would notify him when they hear of the demise of a member. This information is very difficult to obtain, as I am almost entirely dependent on pharmaceutical journals for this knowledge.

All the above is respectfully submitted,

GEO. W. KENNEDY, *Secretary of the Committee on Membership.*

POTTSVILLE, PA., August 10, 1896.

Mr. Ebert gave notice of a proposed amendment to Article III. Chapter vii. of the By-Laws, providing that hereafter no application for membership shall be considered unless accompanied by at least one year's annual dues. He protested strongly that the present method of obtaining members and then having them fail to complete their membership was disgraceful to the Association.

The amendment was laid over for action at a subsequent session.

Chas. E. Dohme, Chairman, read the following report of the Finance Committee, which upon motion of Prof. Hallberg was adopted, the special recommendation as to a reduction in the cost of the Proceedings being referred to the Committee on Publication.

#### REPORT OF FINANCE COMMITTEE.

*To the Council of the American Pharmaceutical Association :*

*Gentlemen :* Your Committee feel constrained to report that the financial outcome of the fiscal year 1895-96 has not been at all a satisfactory one, and for the following reasons :

*First.* Our income from annual dues has been materially reduced, mainly due to "hard times," difficult collections, etc., whilst, secondly, our expenditures have been considerably increased for various seemingly necessary purposes, such as printing and binding a new edition of the National Formulary, embodying a copy of this Formulary into the volume of the last annual Proceedings, thereby increasing its cost, printing a new lot of blank certificates, making an appropriation of \$200 for the use of the Commercial Section, etc.

This has caused the balance for the year to be on the wrong side of the ledger, and given it a decidedly lugly look for reference and as a precedent for future years, unless changed materially, either by way of an increase of income or a decided decrease of expenditures.

Whilst our expenditures have been within the limit of our appropriations (according to the budget submitted by the Finance Committee and approved by the Council), our income has unfortunately not come up to our expectations. Reasons for this must be sought, as stated at the beginning of this report, in the difficulty experienced in collecting our dues, and in the large number of members either dropping out or failing to pay up at all satisfactorily.

The Treasurer fears that to push members in arrears too much at present would be suicidal. As it stands, the unusually large number of eighty-three members have been dropped from the roll within the year, against thirty-seven in 1894 and twenty-six in 1893.

According to the treasurer's account, there are now besides the 83 members already dropped, 209 more members who are 3 years in arrears and hence liable to be dropped. Of these 209 members, the treasurer is under the impression that from at least 150 we will never collect one cent, no matter how much pressure may be brought to bear on them.

This state of affairs really means a considerable reduction in our membership, and naturally following, a decided decrease in our income. The prospective outlook for "better times" (to use a much used and abused phrase) is certainly not very encouraging at present in the pharmaceutical or any other business.

The account of receipts and expenditures figures up, as follows, as taken from the treasurer's report :

<i>Receipts</i> —From membership dues .....	\$5315.00
From other sources.....	1129.12
Total.....	<u>\$6444.12</u>

Total expenditures, including Formulary, \$8386.25.

Not including Formulary, \$7413.62.

(This latter sum is \$184.35 less than the budget appropriation.)

We have, besides the above, an income from the Life Membership fund of \$401.13, but even with this sum added, there remains a deficit of \$1541.00.

We have, of course, considerable amounts owing us on membership dues (of which the treasurer can give you the exact figures) and there are also about \$228.00 due us on Formulary accounts. But even including all these in our income, there is yet such an uncomfortable look about our actual receipts of cash, as compared with our expenditures, that some retrenchment in the latter appears almost a necessity.

Such retrenchments can only be at all feasible in the items of 1st *Proceedings*, which have grown very voluminous of late years, possibly unnecessarily so. We should endeavor to reduce the size of the book judiciously.

The Report on the Progress of Pharmacy could possibly be made as useful, and even more serviceable, by judiciously pruning the report. The various reports of speeches of Chairmen of Sections, Committees, etc., could be either left out entirely or given in skeleton form, and then much space and printing saved.

The other large item of expenditures is the 2nd, *Salaries* of the paid officers of the Association—Treasurer, Permanent Secretary, Reporter on the Progress of Pharmacy and Secretary of the Council. The really very large amount of work entailed on most or all these different officers, and the time consumed in attending to their duties, makes it look almost parsimonious to talk of reducing their really inadequate salaries. Your Committee, however, feel it their duty to lay this state of our finances before your body for consideration and decision, and trust that they may find a way in their wisdom to ensure for us in the future a more satisfactory balance-sheet of the finances of the Association.

Respectfully submitted:

CHARLES E. DOHME,  
J. E. MORRISON.

Upon motion of Dr. Whelpley, seconded by G. W. Kennedy, it was agreed to continue the special Auxiliary Committee on Membership.

The following report of the Publication Committee was read by the Secretary:

#### REPORT OF THE PUBLICATION COMMITTEE.

Your Committee beg leave to report that the Proceedings of the forty-third annual meeting have been duly published and a copy of the same was delivered in May to every member entitled to receive one according to the Treasurer's accounts. Owing to instructions received at Denver for the incorporation of the text of the revised edition of the National Formulary, the present volume of the proceedings has grown to be the largest volume ever published in the history of the Association, containing 1454 pages, of which 208 pages consist of National Formulary text. In spite of the increased size, it has been possible to keep the cost of the book down to that of last year, and the manner of delivery has been improved upon by the use of suitable paste-board cases, whereby injury to the edges of the binding is avoided. As it appeared from correspondence with the Treasurer that a large number of members are in arrears and likely to remain so, it was deemed advisable not to bind up all the 1700 copies printed, and 350 copies have been allowed to remain in flat sheets. Of the remaining 1350 copies, 65 were bound in paper cover and 1285 in cloth; 2 paper-covered and less than 50 cloth bound copies remain on hand at this date.

The cost of publishing and delivering the 1895 Proceedings has been as follows:

Composition, paper and presswork.....	\$2485 19
Illustrations .....	30 50
Binding 1285 copies in cloth and 65 in paper.....	332 87
Expressage: Foreign, \$76.95; Domestic, \$419.98.....	496 93
Postage, Foreign and Domestic .....	11 20
Journals for Reporter on the Progress of Pharmacy.....	59 59
Stenographer's salary .....	157 00
Reporter on the Progress of Pharmacy.....	750 00
	<hr/>
	\$4323 28

Although a reduction of fifty per cent. on the published prices of all Proceedings issued prior to 1891 was ordered by the Association at the Denver meeting, but one member has availed himself of this opportunity of completing his set of the Annual Reports at merely nominal cost, and a large stock of cloth and paper bound copies remain on hand. Some action should be taken to reduce this stock, which is surely not improved by age, and annually involves an outlay of nearly \$40 for storage and insurance.

The complaints made by the pharmaceutical press and by individuals in regard to the tardy appearance of the Proceedings are wholly unwarranted when the magnitude of the work to be done by one man is considered, and it may be stated for sake of comparison, that the annual report of proceedings of the American Association for the Advancement of Science, a volume of 468 pages, less than one-third the size of our own, appeared a month later, in spite of the fact that two secretaries are employed by the Association, at a joint salary of \$1970.

In accordance with instructions received at Denver, the Committee has also published a revised edition of the National Formulary, which was placed on the market at the close of the month of March of the present year. The cost of publishing this revised edition, the book comprising 208 pages, has been considerably less than that of 1888, although the first edition was a smaller book by twenty-two pages than the present one. A reduction has been effected not only in the cost of composition and electrotyping of plates, but also in the cost of press-work and binding. By reference to the financial report of the Permanent Secretary it will be observed that nearly the whole cost of the first issue of the revised edition was covered by sales made during April, May and June, leaving a good stock of books on hand at this date from which a handsome profit will be realized in the near future. This source of income to the Association will no doubt continue to improve.

C. LEWIS DIEHL, *Chairman*.

On motion of M. Hallberg, seconded by Mr. Thompson, the report was received and approved, and adopted as part of the Proceedings.

The Report of the Chairman of the Council on the Invested Funds of the Association was read by W. S. Thompson, and upon motion of Mr. Ebert, received and adopted.

#### REPORT OF THE CHAIRMAN OF THE COUNCIL ON THE FUNDS OF THE ASSOCIATION.

The investments and cash belonging to the several funds of the Association in possession of the Chairman of the Council at the close of the fiscal year June 30, 1896, consist of—

##### *Ebert Fund.*

U. S. Registered 4 per cent. bond No 160,603.....	\$100 00
" " " " " " 67,880.....	500 00
" " " " " " 2,125.....	100 00
	<hr/>
	\$700 00

Cash in Bank at last report ..	\$117 47	
Received during year for interest and bank dividend.....	29 65	
	<hr/>	
	\$147 12	
April 10, paid for U. S. Bond 2,125.....	117 00	
June 30, '96, balance in Strafford Savings Bank, Dover. N. H.	<hr/>	\$30 12

*Centennial Fund.*

U. S. Registered 4 per cent. bond No. 145,640.....	\$1,000 00	
" " " " " " 160,604.....	100 00	
" " " " " " 2,126.....	100 00	
" " " " " " 2,127.....	100 00	
	<hr/>	\$1,300 00
Cash in bank at last report.....	\$239 42	
Received during year from interest and bank dividend.....	55 46	
	<hr/>	
	\$294 88	
April 10, paid for 2 U. S. Bonds 2,126 and 2,127.....	234 00	
June 30, '96, balance in Strafford Savings Bank, Dover, N. H.	<hr/>	\$60 88

*Life Membership Fund.*

Ten (10) U. S. Registered 4 per cent. Bonds, each for \$1,000.00 (Nos. 145,639, 145,761, 145,762, 150,826, 150,827, 150,828, 164,185, 164,889, 173,049, 185,893).....		\$10,000 00
Cash in bank at last report.....	\$1,033 27	
Received during year for interest and bank dividend.....	401 13	
" " " " Life Membership fee.....	10 00	
	<hr/>	
	\$1,444 40	
1895, Oct. 8, paid for U. S. Reg. 4 per cent. Bond, 185,893....	1,122 50	
June 30, '96, balance in Strafford Savings Bank, Dover, N. H.	<hr/>	\$321.90

*General Fund.*

Three (3) American Security & Trust Co.'s 5 per cent. debenture bonds, No. 26, 27 and 28, each for \$1,000.....		\$3,000.00
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In this report only the face value of the securities is given. No allowance is made for the premium on U. S. Bonds, which at this time varies from 8 per cent. to 17 per cent., according to issue

All interest is paid to date.

W. S. THOMPSON, *Chairman of Council.*

*Washington, D. C., July 1, 1896.*

The President called for the Report on the Revision of the U. S. Pharmacopœia.

DR. BARTLEY: As this is a purely scientific matter, I would move that it be read by title and referred to the Section on Scientific Papers.

The report was accordingly read by title and referred.

The Secretary read the Report of the Committee on General Prizes:

## REPORT OF COMMITTEE ON PRIZE ESSAYS.

*To the Council of the American Pharmaceutical Association :*

Your Committee on Prize Essays, appointed at the Denver Meeting, respectfully submit the following report.

After careful examination and consideration of the various papers submitted, we recommend that the prizes be awarded as follows :

Edward Kremers, First Prize, for his paper on "The Chemical Composition of the Volatile Oil of *Monarda Fistula*."

Edson S. Bastin, Second Prize, for his paper, "The Structure of our Wild Cherry Barks."

Alfred R. L. Dohme, Third Prize, for his papers, "What is the pure Aconite of Commerce?" "Assay of Ergot," "Alkaloidal Value of Jaborandi," "A Comparison of Best Known Methods of Assay for Coca," and "Alkaloidal Value of Ipecac Stems."

EDGAR L. PATCH,  
CHARLES RICE,  
GEO. B. KAUFFMAN,  
*Committee.*

Mr. Ebert moved that it be received and adopted. Carried.

The Committee on Ebert Prize reported as follows :

## REPORT OF COMMITTEE ON EBERT PRIZE.

The undersigned Committee on the Ebert Prize have carefully considered the papers presented to this society at the Denver meeting. We find that none of them are entitled to the prize, as notwithstanding their many merits, they do not meet the requirements of the donor.

Respectfully,

JOHN URI LLOYD,  
J. N. HURTY,  
VIRGIL COBLENTZ.

Upon motion of Mr. Watson, duly seconded, the report was received and adopted.

The reports of the Auditing Committee were next read by Chas. E. Dohme and, on motion, adopted.

## REPORTS OF THE AUDITING COMMITTEE.

*To the Council of the American Pharmaceutical Association, meeting at Montreal, Canada, August 12, 1896 :*

The undersigned Committee, appointed by the Council of the American Pharmaceutical Association to examine the books and annual report of the Chairman of the Council, as also the invested funds of the Association, report same to be correct and agreeing with the books of the Treasurer.

Respectfully submitted,

CHARLES E. DOHME,  
DAVID M. R. CULBRETH, M. D.,  
J. F. HANCOCK.

BALTIMORE, July, 1896.

*To the Council of the American Pharmaceutical Association, meeting at Montreal, Canada, August 12, 1896 :*

The undersigned Committee, appointed by the Council of the American Pharmaceutical Association for the purpose of examining the books and accounts of the Treasurer, have performed the duties assigned them, and report that they have found, after a most



thorough examination, all entries correct, and the disbursements to correspond with the vouchers.

Respectfully submitted,

CHARLES E. DOHME,  
DAVID M. R. CULBRETH, M. D.,  
J. F. HANCOCK.

BALTIMORE, *July*, 1896.

*To the Council of the American Pharmaceutical Association, meeting at Montreal, Canada, August 12, 1896 :*

The undersigned Committee appointed by the Council of the American Pharmaceutical Association to examine the books and report of the Permanent Secretary, have performed the duties assigned them, and found the books and annual report to be correct and agreeing with the books of the Treasurer.

Respectfully submitted,

CHARLES E. DOHME,  
DAVID M. R. CULBRETH, M. D.,  
J. F. HANCOCK.

BALTIMORE, *July*, 1896.

MR. HALLBERG: If I am in order, I would like to introduce a subject that I have been thinking about for several years. It seems to me that this Association would do well to avail itself of the practice and methods of other associations in attaching some kind of a beneficiary feature, voluntary or involuntary, to the membership of this Association; and I move that a committee of three be appointed to report to this Association next year on the feasibility of attaching a beneficiary feature to the membership in this Association. The history of associations in Europe—I believe every one of them without exception—shows that they have some kind of a beneficiary feature or benevolent fund attached to them; and were we to adopt such a feature it would not only largely increase our membership, but we would often be in a position to help those who have spent years in this Association and worked in the cause of pharmacy. Therefore I make the motion.

The motion was seconded by Mr. Ebert and carried.

After a recess of one and one-half hours to allow members to lunch, the meeting reconvened at 3 o'clock.

The report of the Delegation to the American Medical Association was presented by Prof. Remington and read as follows :

*To the American Pharmaceutical Association:* The delegation appointed by your President to accept the invitation of the American Medical Association to meet with them at Atlanta, Georgia, May 6, 1896, duly performed their duty, and although a majority of the Committee were not able to journey to Atlanta in May, this Association was well represented in the Section of Materia Medica, Pharmacy and Therapeutics of the American Medical Association. One of our members, Dr. F. E. Stewart, was elected Chairman of the Section and contributed a number of papers for publication. Members who were unable to be present furnished papers, and the paper of Dr. Charles Rice upon Doses, and the introduction of synthetic remedies whose trade names are copyrighted or protected into the next Pharmacopœia, has been widely commented upon by the pharmaceutical journals and discussed in many quarters.

Your Committee are of the opinion that this movement for furnishing a medium for the interchange of views which are of mutual interest to both the medical and pharmaceutical professions should receive the hearty support of this body, and so long as the American Medical Association continue to extend the hearty welcome to pharmacists of the American Pharmaceutical Association that they have always done, much good in the future can be expected. This view becomes evidently of more importance as the time

for revising the new Pharmacopœia approaches, the papers read by members of this body are duly published in the journal of the Medical Association, and a medium of wide circulation before the whole medical profession in America is thus provided. Your Committee, therefore, recommend the continuation of the practice of sending a delegation from this Association to their meetings.

Respectfully submitted,

JOSEPH P. REMINGTON, *Chairman*.

Prof. Diehl moved that this report be received and published in the Proceedings. Carried.

DR. STEWART: I would like to make a few suggestions in that connection, as I was Chairman of the Section of the American Medical Association. In the first place, Dr. Rusby read a very valuable paper before the meeting, in which he suggested the joint investigation of *Materia Medica* by this Association, by means of the Section on Therapeutics and *Materia Medica*, with the American Medical Association. I think that suggestion is a valuable one, and I hope some means will be taken to have it carried out. I am sorry that Dr. Rusby is not here, as he could go into an explanation of this better than I can. I merely make the suggestion now so that it may come up for debate.

I now move that a committee be appointed to take into consideration the suggestion of Professor Rusby for a joint investigation of *Materia Medica* with the American Medical Association by the American Pharmaceutical Association by means of the Section on *Materia Medica* and Therapeutics.

THE PRESIDENT: What are your reasons that such action should be taken?

DR. STEWART: My reasons are that pharmacology or the science of drugs has two sides, the pharmaceutical and the therapeutical, and unless the two are worked together it is impossible for us to know the true merits of any drug introduced into *materia medica*; but by such joint investigation both sides would be brought out, and we would have the merits of the drug, or the proportions, fixed by such investigation.

THE PRESIDENT: Allow me to ask one question—How does it occur to you that such joint investigation should be carried on?

DR. STEWART: The best way of doing so would be to have a plan drawn up. Several plans are now in existence for such investigations, and a plan might be adopted by our Section on *Materia Medica* and Therapeutics at its next meeting, and after it is adopted it might be carried out by a joint committee in a proper manner.

It was moved by Mr. Thompson, seconded by Prof. Sayre, that the subject matter of Dr. Stewart's motion be referred to the Scientific Section for consideration, to be reported back to the Association.

Carried.

The President asks for Report of the Special Committee on Membership.

DR. WHELPLEY: The Auxiliary Committee on Membership is a special committee which has been in existence for the past four or five years. The object of appointing this committee was to have a representative of the Committee on Membership in each section of the United States and Canada, so that when a person applied for membership in the organization, the chairman of the committee could apply to the local member of the committee and ascertain information about the applicant, which information could not be obtained otherwise. Another object of the committee is to have some one in each State, Territory and Province, who will look after the local work of bringing the American Pharmaceutical Association before the meetings of the local organizations.

In these two respects the committee has accomplished considerable work, and I believe now that the amendment to the by-laws has been proposed by one of our members, whereby we will no longer propose names of members who do not accompany their application with the sum of \$5.00, the membership fee, we will be able to accomplish more substantial work in the future than in the past. Probably the best result of the work of this committee is in the direction of bringing the Association prominently before the pharmacists of the country at the annual meetings of the local associations—in this way, not only gaining new members, but delegates where State meetings are held. I believe that the amendment to have the American Pharmaceutical Association meet in Minneapolis results from the agitation caused by our local member of the Committee of Membership, so that in going there we see one of the results of work of this committee. The real report of this committee is made by the Secretary. These are simply supplementary remarks and general opinion.

Mr. Ebert moved that the report be received, and that the thanks of the Association be given these gentlemen, members of this committee, for the work which they have done gratuitously, and also to the pharmaceutical journals who have aided them in this work.

The motion was seconded by C. E. Dohme and carried.

Dr. Stewart then read the Report of the Committee on National Legislation.

#### REPORT OF THE COMMITTEE ON NATIONAL LEGISLATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

There are several points of importance which must be considered in attempting to legislate in pharmaceutical matters. Pharmacy is a department of medical science, and its practice is a medical art. Being dependent upon therapeutics, it is in close relation with the practice of the physician and dependent thereon. This fact must not be lost sight of, because it is necessary to have the co-operation of the medical profession in securing the passage of laws which shall properly regulate the practice of pharmacy.

Medicine is one of the so-called learned and liberal professions, and, therefore, pharmacy must also be regarded in the same light, and its practice must conform to the demands of science and be compatible with the interests of medical practice as a whole. Let us consider, therefore, briefly what these requirements are.

From time immemorial the medical profession has been founded upon the beneficent ideal which requires the physician to publish the knowledge of his discoveries for the benefit of science, of the profession, and of suffering humanity. Pharmacy must be practised with the same liberal spirit, otherwise the interests of the two professions can never be amalgamated. Again, the physician who would restrain the knowledge of a valuable medicinal discovery for money-making purposes, would soon lose caste, not only with his profession, but with the public at large.

Original investigation in the domain of drugs and preparations of the same, and its publication, is necessary for progress in the science and art of pharmacy. On it depend our colleges of pharmacy, our pharmacopœias, text-books, pharmaceutical and medical press. All methods which lock up knowledge to trade secrecy are therefore inimical to pharmacy, and in legislating the fact must always be borne in mind. There is constant conflict going on between trade and science, which is recognized by the United States Patent Laws, which are devised for the purpose of protecting science on the one hand, and trade on the other. The recognition of this conflict is a very important matter in all attempts to legislate in behalf of pharmacy. Further reference to the patent laws will be made later on in this report.

Every pharmacist should, as far as possible, select and prepare drugs for dispensing. On his skill in so doing depends in part his reputation and standing as a professional man. Schemes of proprietorship and monopoly devised to prevent the pharmacist from exercising his prerogative, are fit subjects for consideration.

It is for the interest of the public that a class of the community should be educated, trained, and set apart for the important vocation of preparing and dispensing poisons; and all medicines virtually belong to the class of toxic substances. It is apparent, therefore, that the pharmaceutical profession should be specially protected by pharmacy laws which restrain others from entering the field without like qualification.

The reason why the pharmacist has a right to demand special class legislation in the form of pharmacy laws, is because of the peculiar nature of his vocation, which prevents him from taking advantage of many so-called business methods considered legitimate in trade. Therefore, in competition with merchants engaged in like occupation, viz., in manufacturing and selling medicines, he does not possess an equal chance in making a livelihood. As it is for the interests of the public that he should not resort to the ordinary methods of advertising, which create a fictitious demand for medicines and cause people to unduly dose themselves with drugs of all kinds, it is likewise of interest to the public that laws should be passed which will permit the pharmacist to obtain a competence in the practice of his vocation in a professional manner. Only by so doing will the better class of the community be attracted to the profession as a vocation and the interests of the public served by competent men.

That pharmacy is degenerating into a trade is apparent when the editor of one of our leading pharmaceutical journals says in a recent editorial: "Times and conditions of things have changed and are still rapidly changing, and the pharmacist must change with them. Every day he becomes less of a professional man, and more of a merchant; and unless he learns the ways of a merchant, he must become and remain a mendicant, beseeching men of stronger mould for help to gain a precarious and uncertain livelihood among the ruins of his former profession. Men go into business, not for philanthropy or amusement, but to make money. A desire for gain and to rise in the world are the inducements, and the druggist is no exception to the rule. If the retailer has at last caught this idea and spirit, his salvation is assured."

Various plans of relief from the unfair methods of trade competition with the proprietary medicine houses, department stores, etc., have been proposed, and your Committee believes that the only method of relief consists in the recognition of pharmacy as a liberal profession, its practice in a professional manner, and its protection as a special class of the community—such protection being for the true interest of the public at large.

Among the various plans of relief which have been proposed, the passage of a National Pharmacy Law has been advocated by some. As at present constituted, the government of the United States is of such nature that the passage of a law of this kind would be unconstitutional. A national law to prevent transit of adulterated products from state to state would be practicable under the constitution, which permits the regulation of interstate commerce. It is also constitutional for each state to resign its quarantine into the hands of the National Department of Public Health, if such department is finally organized. At the present time several of the states have resigned a part of their quarantine to the Marine Hospital Bureau, and there is some talk of elevating this branch of the service to the dignity of a National Department of Public Health, and creating a new office in the President's Cabinet to be known as the Secretary of Public Health.

The recent legislation of Congress in regard to tax-free alcohol seemed by your committee to be objectionable to the best interests of pharmacy, and therefore your committee in co-operation with various other committees from state and national associations succeeded in rendering the obnoxious law inoperative. Your committee is aware,

however, of the great benefits that might accrue if the excessive tax on alcohol as used in the arts and in medicine could be removed in such a manner that all could be equally benefited, and recommend that a law be formulated with the objectionable features characterizing the obnoxious law referred to eliminated therefrom.

Your committee was not successful in its efforts to remove the \$25 license fee required of the druggist for selling wines and liquors for medicinal use. It recognizes the necessity of having alcoholic liquors in the drug stores to meet emergencies, but suggests that a mixture might be devised containing alcohol to meet this requirement. The alcoholic liquors sold as a beverage might be dropped from the Pharmacopœia and such a compound substituted therefor. This would remove the temptation of running a drinking saloon under the guise of a drug store without paying a liquor dealer's license. Those who desire to dispense alcoholic liquors as a beverage should be made to pay the same license as the saloon keeper.

Your committee made a careful study of the Patent, Trade-mark and Copyright Laws, and begs to report as follows:

The United States copyright and patent laws are founded on Clause 8 of Sec. VIII., of the Constitution, which permits Congress to secure to authors and inventors, for limited times, the exclusive use of their respective writings and discoveries.

What can be copyrighted? The United States Laws (Revised Statutes, Secs. 4948-71, being the Act of July 8, 1870; also amendatory Act of June 18, 1874), mention as subjects of copyright, "any book, map, chart, dramatic or musical composition, engraving, cut, print, photograph or negative thereof, . . . . . painting, drawing, chromo, statue, statuary . . . . . models, or designs intended to be perfected as works of the fine arts," and includes (amendment of 1874), as subject only to registry in the Patent Office, prints or labels not "connected with the fine arts" but "designed to be used for any other articles of manufacture."

What cannot be copyrighted? "Copyrights cannot be granted upon trademarks, nor upon mere names of companies or articles, nor upon prints or labels intended to be used with any article of manufacture. If protection for such names or labels is desired, application must be made to the Patent Office, where they are registered at a fee of \$6.00 for labels and \$25.00 for trademarks." (From Official Directions for Securing Copyright, issued by the Librarian of Congress, 1885.)

The registering of trademarks, etc., does not secure any protection from the Patent Office which imposes obligations thereon to restrain others from copying the things so registered; but notice is thereby given that property rights are claimed therein by those who thus register. The validity of such claims can only be settled by the courts.

What can be patented? The law provides, "That any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, or not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, may, upon payment of the duty required by law, and other due proceedings had, obtain a patent therefor." (Sec. 24, Act of July 8, 1870.)

In a communication from the United States Patent Office in answer to a communication addressed to the office by one of our leading pharmaceutical journals, the following occurs:

"Under the latter head (compositions of matter), medicines of different kinds are patented. They are either mixtures of known drugs, or of substances not before recognized as possessing therapeutic value, or are new chemical compounds.

"In some countries, as in Germany, patents are not allowed on the first on the ground that they are only physicians' prescriptions, viz., the expected skill of one 'skilled in art.'

"This same principle of action has been followed to some extent by the United States Patent Office, as illustrated by the following extracts from a decision of the board of examiners-in-chief, an appellate tribunal of the office, in case of Caffall MS., Vol. 18, p. 322.

"It was never intended that any new composition of matter or mixture of samples should be the subject of monopoly. If rhubarb and senna, or calomel and jalap, were for the first time put together, he who should do it, whether regular practitioner or quack, would not be an inventor or discoverer under the law. If done by a doctor it would only be the exercise of ordinary professional skill; if by another, it would be but an ignorant jumble of things having supposed virtues and benefits to be obtained by the union of known drugs."

"Under this and similar decisions patents for mere prescription have in later years been generally refused, only when drugs are employed whose therapeutic effects are not known, or mixtures of decided novelty, have been allowed."

"As a matter of fact, the medicines whose sale has proved most profitable, and which are generally known as 'patent medicines,' are not patented at all, but are protected by trade-marks, which are common law rights."

"Patents for new chemical compounds, or new processes, however, stand on entirely different footing, since, as a rule, they result from the exercise of the highest skill in chemistry, and are the most substantial additions to public knowledge. Those who oppose patents of this kind have an entirely erroneous idea of the nature and operation of patent law, which has produced so great benefits to the United States that all countries are changing their laws to bring them more like the law of the United States."

Now comes the question whether the only name by which an article is known can be a valid trade-mark. On this question the courts differ. The reasons for this difference are various; but one reason is the different opinion in regard to what is meant by a descriptive name. All authorities admit that a name which describes an article cannot be a trade-mark. That is now considered an axiom in law. It is admitted that a coined name, arbitrarily chosen, can be a trade-mark, *if it is used as a trade-mark*. But when it is the only name by which the article is known to the public, does it not become descriptive by use, and cease to be a trade-mark? The weight of authority seems to be against such a claim on the part of manufactures who employ the only names of articles as trade-marks. A number of good reasons for their adverse opinion may be cited.

In the first place, this use of a trade-mark would defeat the very end for which the patent law was devised, and for two reasons: As a trade-mark is a creature of natural right and common law, it does not expire like a patent. The expiration of the time for which it is registered at the Patent Office does not invalidate it as a trade-mark. Some trade-marks are now centuries old, like those on Chinese vases, for example. If an inventor, or manufacturer of prescriptions, is permitted to use the only name of an article as a trade-mark and keep the knowledge of manufacture secret, then he can establish a monopoly which is everlasting. This is diametrically opposed to the patent law, which requires the publication of inventions, and limits the monopoly to a stated period of years. There is no inducement offered to the patenting of any article that can be monopolized for all time in this way. In the second place, if the only name of an article can be employed as a trade-mark, it permits the continuance of the monopoly of a patent article after the patent expires. The case of Horsford's Acid Phosphate is an example of this. After the patent for the article ran out, the Rumford Chemical Company attempted to continue the monopoly under the trade-mark law, claiming that the name "acid phosphate" was private property, but were restrained by the courts.

Among other lawyers your committee consulted Mr. George H. Lothrop, of Detroit, who is considered by the bar to be one of the best patent lawyers in the United States. In his opinion it is absurd to claim that the only name by which an article is known can be a valid trademark. To show the absurdity he used the following illustration: When a baby is born into the world it must be christened with a name. Does the name of the baby belong to the baby, or to the one who named the baby? So every new thing born into the world must have a name given it, and that name belongs to the baby, not to the

one who named it. Therefore the only name by which an article is known to the public can not be a trade-mark, for the public has a right to make and sell every article not patented, and deal in it under its proper designation.

Again, it is an accepted axiom of law that a descriptive name can not be a trade-mark. The only name by which a thing is known becomes descriptive by use, and ceases to be a trade-mark. The courts have defined a descriptive name as the name used by the public in buying the article. That such a definition is compatible with common-sense no one can deny.

Again, a trade-mark can be used as many times as there are classes of objects. A trade-mark on medicine can be used on tooth powder, for example. When a person asks for a dose of antipyrine, would the apothecary be justified in substituting tooth powder? The idea is absurd, but not more absurd than the claim. The public use the name antipyrine to describe a well known chemical. The druggist recognizes the description without difficulty. And if the dispenser substitutes some other substance on which he may brand antipyrine as a trade-mark with equal propriety, such as tooth powder, the manufacturer would be quick to complain of the substitution. If any one will consult Browne on trade-marks, or any other standard authority, he will see that this statement is not in the least exaggerated, and that the words antipyrine, phenacetine, sulfonal, salol, if trade-marks as claimed, may also be used as trade-marks on tooth powders, soap, pottery, etc., etc., just so long as they are not used twice on the same class of articles of commerce. Does not that fact make it clear that the manufacturers of these well known articles are not using the names referred to as trade-marks, but as names wherewith to describe their chemicals?

Finally, if it were lawful to use the only name of a new invention as a trade-mark, it would force every other manufacturer of it to adopt a new name for the same thing, to the confusion of the common language. Think of the synonyms that would now exist for pens, ink, paper, pianos, sewing machines, knitting needles and pins, if the proprietary system had prevailed when these things were invented or introduced.

The following quotations from leading pharmaceutical journals are appropriate and important in this connection:

"The interests of scientific medicine and of the people clearly demand, first, that a patent shall not issue upon a medicinal product of any kind, though the process of its manufacture is equitably subject to patent; second, in case a patent is allowed on both process and product, or either, the law should specifically declare that the title under which such protected article is placed on the market shall be deemed a descriptive title, and hence not valid as a trade-mark. Under existing conditions, monopoly protection in perpetuity is practically granted by the government in violation of the express constitutional provision declaring that 'exclusive rights' shall be granted for 'limited times' only."—*Western Druggist*, May, 1895, p. 198.

"As we understand the principle of patent law, the government should not grant a patent to the medicine (simple or compound) itself, but can give one on some particular process of manufacture. This has frequently been done, especially in the case of certain new remedies (synthetics), but the government has been rather inconsistent in some instances by granting a patent on the article itself, dermatol (bismuth subgallate) and phenacetine, for example. This action, in our belief, is wrong, and would not stand if brought to trial. If not misinformed, the patent on bismuth subgallate has already been successfully assailed. So then, if this belief is correct, the manufacturer can be protected by a patent on only some particular *process* of manufacture, not on the article itself."—*Pharmaceutical Era*, July 9, 1896.

*Trade-marks in Titles.*—The decision of the Michigan Court, which held that the title "Syrup of Figs" did not constitute a valid trade-mark, has been sustained by the United States Court of Appeals in the case of the California Fig Syrup Co., against Fred-

erick Stearns & Co. While the decision is a great victory for the Detroit firm of manufacturing pharmacists, and while it emphasizes the invalidity of a descriptive name as a trade-mark, it is to be regretted that the broader question concerning the validity of any trade-mark constituting the only name by which the preparation is known was not in controversy. The proprietary medicine business, as a whole, is most demoralizing in its effects upon the practice of both medicine and pharmacy. There are good and honest proprietary preparations, as there are also bad and deceptive preparations, the latter taking shelter under the former, and thus bringing the entire system into disrepute. Since a purely descriptive name cannot be trade-marked, and since the only name by which any proprietary or other preparation is known must of necessity be descriptive, the question arises, Can any title serve as a valid trade-mark unless it bears as a part thereof a distinctive mark of possession, such as the owner's name either as a prefix or suffix? Legitimate trade-mark rights cannot be respected too sacredly or guarded too rigorously, but the extension of trade-mark prerogative to cover the titles of the things themselves, and thus granting a monopoly in perpetuity in such products, is opposed to public policy, is a denial of the rights of honest competition, is a menace in particular to the freedom of medicine and of pharmacy, and opposed to the manifest meaning of the federal constitution as well as to the principles of common law. It is to be hoped that the courts will soon be called upon to elucidate authoritatively this phase of the trade-mark question.—*Western Druggist*, May, 1896, p. 194.

In a paper presented this year to the American Medical Association by Dr. Chas. Rice, Chairman of the Committee on Revision of the U. S. Pharmacopœia, he advocated the introduction of the more popular patent and so-called proprietary medicines into the Pharmacopœia. Your committee favors this suggestion, provided the names by which these medicines are commonly known accompany them either as official names or synonyms, also working formulas, so that all may be free to manufacture and deal in them under the common names referred to. As the patent law requires the publication of the *exact* knowledge of every invention whereby the public may manufacture after the patent expires, the application in each case must necessarily contain the working formula or the patent is void.

Unpatented medicines are not proprietary, so that they may be manufactured by all pharmacists in case their true formulæ can be ascertained. As already stated, professional pharmacists will publish their working formulæ for the benefit of science. Formulæ should be devised for those unpatented medicines which have proved of merit, and they should be introduced into the Pharmacopœia. The names by which they are commonly known should be employed either as official names or synonyms. Trade-marks that serve to distinguish between one brand of a well-known article of commerce and another brand of the same article, are unobjectionable. But it must be apparent that the only name of an article is not the proper subject of a trade-mark.

By advocating that unpatented medicines should be considered public property and introduced into the United States Pharmacopœia under the names by which they are commonly known, your committee is not interfering with the rights of any one. Imitation of labels, trade-marks or packages, intended to deceive the public, is highly reprehensible and should meet stern condemnation. But to accuse others of piracy who manufacture unpatented medicines is certainly unjust. The inventors of ink, sewing machines and all other articles of commerce might have claimed, with equal propriety, that every other manufacturer was guilty of piracy.

The importance of the subject of patents and trade-marks in relation to medicine demands a more extended consideration than the limits of this report will allow. Your committee would refer those interested to such standard authorities as "Browne on Trade-Marks," "Simond's Manual of the Patent Law," the article on "Copyright" in the *Encyclopedia Britannica*, and to the address of the Chairman of the Committee be-



fore the Section of Materia Medica, Pharmacy and Therapeutics of the American Medical Association, recently delivered at Atlanta and entitled "The Practice of Pharmacy as a Liberal Profession." Copies of this address will be found on the President's table.

F. E. STEWART, *Chairman*,  
W. S. THOMPSON,  
ALBERT E. EBERT.

Upon motion of Mr. Ryan, seconded by Mr. Thompson, the report was received and referred to the Publication Committee.

MR. EBERT: I would like to say one or two things with regard to the report. I believe that this Committee on National Legislation, which was simply appointed in Denver should be continued by the Association, as it is an important feature.

THE PRESIDENT: That matter will come up in the report of the Committee on President's address.

MR. HALLBERG: I have an amendment that I would like to offer to Article III. chapter IX. of the By-Laws referring to the Committee on Pharmaceutical Education and Legislation. I would like to add to that paragraph the same words as contained in the last sentence of Art. II. of the same chapter.

Under the rules the amendment was laid over for action at the next general session.

A large amount of business having been disposed of, the Association, at 5 o'clock, upon motion, adjourned.

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#### THIRD SESSION—THURSDAY AFTERNOON, AUGUST 13, 1896.

On account of the protracted session of the morning no business was transacted by the Association immediately preceding the session of the Section on Commercial Interests.

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#### FOURTH SESSION—FRIDAY MORNING, AUGUST 14, 1896.

The Convention was called to order at 10:15 a. m. by President Good.

G. W. Kennedy, Secretary of Council, read the names of 26 applicants for membership, duly recommended by Council, which, upon motion, were directed to be posted for inspection as provided in the by-laws.

Upon motion of Dr. Bartley, duly seconded, it was agreed to change the order of business so as to permit the reading of the Report of the Committee on President's Address.

Prof. Diehl, chairman, then read the following:

*To the American Pharmaceutical Association:*

Your Committee, to whom was referred the very able address of our President, takes pleasure to report as follows:

We heartily endorse the several suggestions made by him. We believe with him that the efforts of the committee on the status of pharmacists in the army and navy of the

United States should be continued until the desired reforms shall have been made; also, that the co-operative efforts of this Association to induce Congress to pass a law making the use of the metric system of weights and measures compulsory, should be consistently followed until crowned by complete success.

We recommend that the questions proposed by the Chairman of the Committee of Revision of the United States Pharmacopæia, in his recent paper read before the American Medical Association at Atlanta, be made special topics for discussion at the next annual meeting of this Association, and that prominent notice of this be given to our members.

We also recommend that the Committee on National Legislation be continued and enlarged, and that one or more members from the Dominion of Canada be added to it, thus giving the Committee an international character.

We recommend that the modified resolution respecting the rebate on alcohol, as proposed by the President, be adopted, and that a special committee or delegation be appointed to present the views of the Association before the committee of Congress having this matter in charge.

Finally, we recommend that the greetings of this Association be cabled to the President of Executive Committee of the International Pharmaceutical Exhibition, to be held at Prague, Austria, the present month.

Respectfully submitted,

C. LEWIS DIEHL, *Chairman*,  
F. H. BUTLER,  
FRANK C. SIMSON.

Mr. Remington moved the adoption of the report as read, but after considerable discussion, participated in by Messrs. Ebert, Whelpley and Remington, the consideration of the report and the recommendations contained therein were, upon motion of the Secretary, postponed until the last session, excepting the recommendation relative to cabling the greetings of the Association to the International Pharmaceutical Exhibition at Prague, which latter was, upon motion of C. A. Mayo, adopted, and the Secretary instructed to carry out the same.

It was moved by G. W. Kennedy, seconded by A. E. Ebert, that the fourteen gentlemen, whose names had been presented at the previous session, be invited to complete their membership.

Carried.

The following telegram was received and read, and the Secretary instructed to acknowledge the same appropriately by mail:

STEVENS POINT, WIS., *August 13, 1896.*

The Wisconsin Pharmaceutical Association sends greetings and best wishes to the American Pharmaceutical Association.

E. B. HEIMSTREET, *Secretary.*

The President announced that the directors of the Mechanics' Institute of Montreal offered the free use of the Institute to the members of the Association while in this city, and upon motion of A. E. Ebert, the Secretary was instructed to acknowledge the receipt of the invitation and its acceptance with thanks.

The Secretary of the Council read the minutes of the first session of the

new Council, which, upon motion of Mr. Ebert, duly seconded, were approved as read.

FIRST SESSION OF THE NEW COUNCIL—FRIDAY MORNING, AUGUST 14, 1896.

The new Council was organized by the election of W. S. Thompson, of Washington, D. C., as Chairman, James M. Good, of St. Louis, Mo., as Vice-Chairman, and Geo. W. Kennedy, of Pottsville, Pa., as Secretary.

On motion of S. A. D. Sheppard, the Chairman was requested to present a list of committees for the ensuing year at the next session of Council.

The Secretary presented the names of twenty-six applicants for membership, which, upon motion, were recommended to the Association.

J. P. Remington moved, seconded by S. A. D. Sheppard, that there be a social session of the Association as provided for by Chapter VIII, Art. XVI of the By-Laws, the same to extend from August 18th to 26th; further, that at the close of said social session the present local secretary shall call a meeting for final adjournment of the forty-fourth annual meeting of the Association. Carried.

Upon motion of H. M. Whelpley, seconded by J. M. Good, it was agreed that permission be granted to the publishers of pharmaceutical journals to publish the formulas and text of the National Formulary free of charge, provided, however, that not more than fifty formulas be published in any one month.

The meeting, at 11 o'clock, on motion of the Permanent Secretary, adjourned to give place to the Section on Scientific Papers.

FIFTH SESSION—FRIDAY EVENING, AUGUST 14, 1896.

The Association did not transact any business previous to the second session of the Section on Scientific Papers.

SIXTH SESSION—SATURDAY MORNING, AUGUST 15, 1896.

At 10:30 a. m. President Good called the convention to order, and Secretary Kennedy read the following minutes of Council, which, upon motion, were approved as read:

SECOND SESSION OF THE NEW COUNCIL, SATURDAY, AUGUST 15, 1896.

Council was called to order by Chairman Thompson, twelve members being present.

The Chairman announced the following committees, which, upon motion, were duly elected:

*Committee on Membership:* H. M. Whelpley, Chairman; Geo. L. Hechler, S. P. Watson, G. W. Parisen, W. A. Frost; Geo. W. Kennedy, Secretary.

*Committee on Finance:* Chas. E. Dohme, Chairman; Louis C. Hopp, Wm. C. Alpers.

*Committee on Publication:* C. Lewis Diehl, Chairman; W. J. M. Gordon, Geo. F. Payne, J. P. Remington, Chas. Caspari, Jr.

*Committee on Centennial Fund:* Joseph E. Morrison, Chairman; Chas. E. Dohme, Chas. Caspari, Jr.

*Committee on Transportation:* Ed. Shumpik, Minneapolis, Minn., Chairman; S. A. D. Sheppard, Boston, Mass.; Harry Sharp, Atlanta, Ga.; A. E. Ebert, Chicago, Ill.; W. J. M. Gordon, Cincinnati, O.; Chas. M. Ford, Denver, Colo.; C. A. Mayo, New York,

N. Y.; Louis F. Chalin, New Orleans, La.; H. M. Whelpley, St. Louis, Mo.; Wm. M. Searby, San Francisco, Cal.

Edward Shumpik, of Minneapolis, Minn., having been nominated by W. A. Frost, was elected Local Secretary for the ensuing year.

On motion of Chas. Caspari, Jr., the Secretary of Council was directed to request the Committee on Publication of the Proceedings of the Seventh International Pharmaceutical Congress to present a report at the next annual meeting of the Association without fail.

The following application was received and the request, on motion, granted:

The Special Committee on Indicators hereby makes application to the Council for an appropriation from the Centennial Fund for an amount not to exceed twenty-five (25) dollars, to defray the expense of material used in the investigation of the effect of different indicators in the volumetric estimation of alkaloids and alkaloidal drugs, as shown by the report of results presented to the Scientific Section this day.

LYMAN F. KEBLER, *Chairman*.

*August 14, 1896.*

The Chairman announced that he had appointed the following gentlemen to serve on the Auditing Committee for the coming year: Louis C. Hopp, Chairman; Philip Lehr, Henry J. Sherwood.

S. A. D. Sheppard gave notice of a proposed amendment to Art. IV., Chap. VIII., of the By-Laws, referring to meetings, which under the rules, was laid over for action at a future session.

The Association at 11 o'clock adjourned to enable the Section on Scientific Papers to hold its third session.

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SEVENTH SESSION—SATURDAY AFTERNOON, AUGUST 15, 1896.

No business was transacted by the Association previous to the first session of the Section on Pharmaceutical Education and Legislation.

EIGHTH SESSION—SATURDAY EVENING, AUGUST 15, 1896.

The Association did not meet prior to the second session of the Section on Pharmaceutical Education and Legislation, no special business requiring action having been proposed.

NINTH SESSION—TUESDAY MORNING, AUGUST 18, 1896.

The Association convened in general session at 10:15 a. m., with President Good in the chair.

The Secretary read the minutes of the previous sessions, which, on motion, were approved.

G. W. Kennedy, Secretary of the Council, read the minutes of the third and fourth sessions of the new Council as follows, and these were, on motion, approved as read.

## THIRD SESSION OF THE NEW COUNCIL—MONDAY, AUGUST 17, 1896.

The Chairman, W. S. Thompson, called the Council to order with eight members in attendance.

The Secretary presented the names of ten applicants, which were directed to take the usual course.

## FOURTH SESSION OF THE NEW COUNCIL—TUESDAY, AUGUST 18, 1896.

Mr. Thompson being absent, H. M. Whelpley was elected temporary chairman, eight members being present.

The Special Committee on the Status of Pharmacists in the U. S. Army and Navy, through its chairman, Dr. Geo. F. Payne, reported that they had incurred a debt of \$97.50, stating at the same time that the total expenses of the committee for typewriting, stationery and postage had been \$533.20, of which sum \$435.70 had been paid by voluntary contributions from various sources.

On motion of Chas. Caspari, Jr., the amount of the deficit, \$97.50, was ordered to be paid the Committee.

On motion of Chas. E. Dohme, Council agreed to recommend to the Association the appropriation of a sum of money not to exceed \$50.00 for the use of the Special Committee on the Status of Pharmacists in the Army and Navy, for the year 1896-97.

Mr. Kennedy read the names of ten applicants for membership recommended by Council. There being no objection made to any of the names, it was, upon motion, agreed that these ten gentlemen, together with the twenty-six whose names had been posted at the fourth session, be invited to complete their membership.

The Special Committee on the Status of Pharmacists in the U. S. Army and Navy, through its chairman, Dr. Geo. F. Payne, presented the following lengthy report, which was read in abstract :

REPORT OF THE SPECIAL COMMITTEE ON THE STATUS OF PHARMACISTS IN THE UNITED STATES ARMY, NAVY AND MARINE HOSPITAL SERVICE.

*Mr. President and Fellow Members of the American Pharmaceutical Association :* The Special Committee on the Status of Pharmacists in the United States Army, Navy and Marine Hospital Service beg leave to make the following report of work done during the past year :

The two bills which were embodied in our first report, made last year at the Denver meeting, were placed there simply as starting points, that we might obtain suggestions and criticisms upon them, and with the help of such advice be enabled to draw up suitable bills. We opened a correspondence with a large number of apothecaries and hospital stewards, both of the Army, Navy and Marine Hospital Service, and three bills were drawn up as the result of the advice and suggestions of these gentlemen. These three bills were presented at the first session of the 54th Congress, being introduced in the Senate by Hon. A. O. Bacon, and in the House by Hon. Chas. F. Crisp. They are as follows :

## ARMY BILL.

*Senate Bill, No. 1768.*

Introduced January 24, 1896.

Read twice and referred to Committee on Military Affairs.

*House Bill, No. 1662.*

Introduced December 16, 1895.

Read twice and referred to Committee on Military Affairs.

## A BILL

TO AMEND AN ACT ENTITLED, "AN ACT TO ORGANIZE THE HOSPITAL CORPS OF THE ARMY OF THE UNITED STATES, TO DEFINE ITS DUTY, AND FIX ITS PAY," APPROVED MARCH FIRST, EIGHTEEN HUNDRED AND EIGHTY-SEVEN.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That sections one, two, three, four, seven and eight of an Act to organize the Hospital Corps of the Army of the United States, to define its duty, and fix its pay, shall be amended as follows:

By placing the word "pharmacists" before the words "hospital stewards," and striking out the words "acting hospital stewards."

Section two: By striking out the words "hospital stewards" and putting the word "pharmacists" in place of them, and by striking out the words "hospital steward" and placing in lieu of them the word "pharmacist."

Section three: By striking out the words "hospital stewards" and putting in lieu of them the word "pharmacists." By striking out the words "forty-five" and in lieu of them putting the words "seventy-five." By striking out the words "ordnance sergeants" and putting in lieu of them the words "sergeants major."

Section four: By striking out the words "hospital steward unless he" and placing in lieu of them the words "pharmacist unless he be a graduate in pharmacy and," and by striking out the words "one or more medical officers" and placing in lieu of them the words "to be appointed by the honorable Secretary of War."

Section seven: By striking out the word "acting" in the two places in which it occurs; by striking out the words "hospital stewards," in the last line, and placing in lieu of them the word "pharmacists," and by adding to the section the following words:

"Upon the passage of this Act all hospital stewards now in the United States Army shall be placed upon the list of pharmacists with rank, pay and privileges of the same, and their names shall be entered in the order of their admission to the service. Pharmacists may, on application, be retired after thirty years' service on seventy-five per cent. of their pay and allowances at date of retirement."

Section eight: "That all acts and parts of acts, in so far as they contravene the provisions of this Act, are hereby repealed."

## NAVY BILL.

*Senate Bill, No. 1769.*

Introduced January 24, 1896.

Read twice and referred to Committee on Naval Affairs.

*House Bill, No. 1664.*

Introduced December 16, 1895.

Read twice and referred to Committee on Naval Affairs.

## A BILL

GIVING APOTHECARIES OF THE UNITED STATES NAVY AND NAVY HOSPITALS THE TITLE OF NAVAL PHARMACISTS AND RANK AND PAY OF WARRANT OFFICERS.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That upon the passage of this Act all apothecaries serving in the United States Navy and Naval Hospitals shall be known and designated as naval pharmacists, and shall be placed upon the list of warrant officers with rank, pay and privileges of the same, and their names shall be entered in the order of their admission to the service. Nothing in this Act shall deprive an enlisted or appointed apothecary of a warrant as a naval pharmacist; and they shall retain their position in the Navy and Hospital Corps of the Navy, and shall be eligible for duty both ashore and afloat.

SECTION 2. That there shall be as many Naval Pharmacists warranted from time to time as in the judgment of the Secretary of the Navy the service may require, and not more than one Naval Pharmacist shall be stationed at any hospital, laboratory, station or ship without special authority of the Secretary of the Navy, who shall make such regulations for the government of Naval Pharmacists as may be necessary.

SEC. 3. That no person shall be warranted as Naval Pharmacist, except as above provided, unless he be a graduate in pharmacy and shall have passed a satisfactory examination before a board to be designated by the honorable Secretary of the Navy as to his qualifications for the position; and no person shall be eligible for such examination except by written authority of the Secretary of the Navy.

SEC. 4. That all Naval Pharmacists who shall have served the time required by law, upon their written

request, shall be placed upon the retired list of the Navy, as provided for other warrant officers. And those who, upon the passage of this Act, shall have reached the age of sixty-two, shall be placed on the retired list of the Navy with the pay of a warrant officer, retired, of the highest order.

SEC. 5. That all acts and parts of acts, in so far as they contravene the provisions of this Act, are hereby repealed.

### MARINE HOSPITAL BILL.

*Senate Bill, No. 1770.*

Introduced January 24, 1896.

Read twice and referred to the Committee on Commerce.

*House Bill, No. 1063.*

Introduced December 16, 1895.

Read twice and referred to Committee on Commerce.

### A BILL

PROVIDING FOR THE APPOINTMENT OF PHARMACISTS IN THE UNITED STATES MARINE HOSPITAL SERVICE, AND FIXING THEIR PAY AND ALLOWANCES.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Treasury is hereby authorized and directed to appoint, as the necessities of the service may require, pharmacists, to be permanently attached to and be warrant officers of the United States Marine Hospital Service, said appointment to continue during the good behavior of the appointee.

SECTION 2. That the pay of pharmacists under this act shall be seventy-five dollars per month, with increase of ten per centum for every five years' service; *Provided*, That said increase shall in no case exceed forty per centum of the pay fixed by this section.

SEC. 3. That no person shall be appointed a pharmacist under the provisions of this act, unless he be a graduate in pharmacy, and shall have passed a satisfactory examination before the board of officers of the Marine Hospital Service, except as hereinafter provided.

SEC. 4. That all hospital stewards now serving in, and attached to, the United States Marine Hospital Service, shall, upon the passage of this act, be appointed and warranted pharmacists under section one of this act, to take order and precedence according to their original appointment as hospital stewards.

SEC. 5. That pharmacists appointed under the provisions of this act shall be entitled to quarters, subsistence, fuel, lights, and actual travelling expenses when on duty, or commutation therefor, at rates fixed by the Secretary of the Treasury.

SEC. 6. That all acts and parts of acts, in so far as they contravene the provisions of this act, are hereby repealed.

Neither of these three bills asks for commissions. While we felt that pharmacists in the service of our government were entitled to commissions, it still seemed advisable to leave commissions out of the fight, and to labor to secure compensation in some way commensurate with attainments required and services rendered, and to ask only for the highest rank as non-commissioned officers. In this way, if successful, a great advance would be accomplished, and our government pharmacists would be rescued from their present degraded and ignoble position and placed far in advance of where they now stand. If the fight was made for commissions, the opposition to our bills would be enormously increased. Commissions for apothecaries and hospital stewards would produce so radical a change in the three branches of the government service that the three departments would most actively oppose their being granted.

We began our campaign of education vigorously last year, feeling assured that if we could convince the Departments and the Congressmen as to the true facts in the case, we would win success. The apothecaries of the navy, the stewards of the marine hospital service, and the hospital stewards of the army soon learned of our efforts in their behalf, and aided us in many ways in becoming familiar with the points on which we desired to become informed. The prominent pharmaceutical periodicals have been a unit in the active, energetic manner in which they have worked to advance our cause. We would like to name each paper individually which has helped us so well and thank them in the name of pharmacy, but we fear that words would fail us—and if we did not mention all we might do some injustice. Our pharmaceutical journals are now in closer touch with the members of our profession than they have ever been. That pharmacy is a profession is in no way better elucidated than by the high character of the journals supported by

the pharmacists of the United States. No civilized country can show a pharmaceutical press conducted with equal ability. The daily papers have also come to our aid in many cases; the State Pharmaceutical Associations have joined us in our labors; the colleges of pharmacy have responded to every appeal for work; every State Board of Pharmacy has written strong letters in behalf of our bills; the wholesale druggists have brought their influence to bear; and last, and mightiest of all, the retail pharmacists of the land have awakened from their lethargy and responded with an enthusiasm which we thought it would be next to impossible to arouse.

Many seemed fearful lest we would not be able to secure consideration of our bills at the last session of Congress, and urged their early presentation. They were presented in the House on December 16, 1895, and in the Senate on January 24, 1896. They went to the various committees and were soon submitted to the Departments of War, the Navy and the Treasury, for reports upon them. These reports were unfavorable, but were made upon such weak grounds that we feel most hopeful of ultimate success. If the reports from the departments had been favorable the three bills would now be laws, as we have aroused a sentiment in Congress overwhelmingly in our favor. A majority of both Senators and Congressmen have promised to vote for the bills when they come up. If we can secure favorable consideration of our bills from the Departments by the next session of Congress we feel sure of success; if we do not obtain such consideration we feel that we may fail in spite of our many promised votes, as Congress is not inclined to vote for anything affecting the Departments which is not approved by them. Letters have poured into Congress and into the Departments. Over 150,000 letters have been written by the pharmacists of the United States to the proper parties in Washington, asking their support. One member of the Senate stated in a personal interview that he alone had received over 1,000 letters in regard to the matter. We feel much encouraged at the way all pharmacists have responded to our appeals. Some Congressmen assure us that we will win even without the approval of the Departments, others tell us that the approval of the Departments is necessary for success, yet all unite in saying that *success is sure* if we keep up our present active, energetic work.

The reports made upon our bills to the various committees by the three Departments are given below, as far as we are aware of their being made:

#### REORGANIZATION OF THE HOSPITAL CORPS.

15011. In reply to No. —.

WAR DEPARTMENT, SURGEON GENERAL'S OFFICE, }  
WASHINGTON, February 19, 1896. }

*To the Honorable the Secretary of War:*

*Sir:* Referring to House Bill 1662, enclosed herewith, which has been referred to me for remark, I have the honor to submit the following opinion:

The legislation proposed appears to me to be unnecessary and not in the interest of the service. Our present organization of the Hospital Corps is very satisfactory, and I should decidedly object to changing the designation "hospital steward" to "pharmacist." A hospital steward is much more than a pharmacist, and men are selected for this position not alone on account of their knowledge of pharmacy but because of other necessary qualifications. The hospital steward has control, under the surgeon, of the administration of the post hospital, and of the discipline and instruction of the hospital attendants, of the reports and returns, and of all medical property at the post hospital, etc. Many of our best hospital stewards have been non-commissioned officers in the line of the army, where they have learned to control men and to administer affairs in accordance with military methods, and in future no doubt some of our most competent stewards will be obtained from this source. The necessary knowledge of pharmacy may be learned by an intelligent man in the dispensary of the post hospital, and our acting hospital



stewards, who are appointed from among the privates of the Hospital Corps, are carefully examined as to their knowledge of pharmacy and various other matters considered equally essential. A similar examination is required before an acting hospital steward can be promoted to the grade of hospital steward.

For the reasons above stated I am unable to recommend a favorable report upon this bill.

Very respectfully,

GEO. M. STERNBERG, *Surgeon General U. S. A.*

*Copy.*

NAVY DEPARTMENT, WASHINGTON, *February 12, 1896.*

*Sir:* I have the honor to acknowledge receipt of your letter of the 25th ult., enclosing Senate Bill No. 1769, "Giving apothecaries of the United States Navy and naval hospitals, the title of naval pharmacists and the rank and pay of warrant officers," and asking the opinion of the Department thereon.

The enlisted men now assigned to the Medical Department of ships are known as apothecaries and baymen. The apothecaries are required to be graduates of a college of pharmacy and to pass an examination before a board, composed of three medical officers of the Navy.

The scope of this examination is shown in Naval Regulation Circular No. 2, dated March 13, 1893, a copy of which is hereto attached. In the opinion of the Department, an innovation upon naval nomenclature should never be made unless for good reasons, and it does not appear why the name of pharmacist is better than the time-honored appellation of apothecary. Neither should the status of any corps in the Navy or part thereof be disturbed, if the service in the particular branch is efficient, and the positions to be affected by the legislation are sufficiently desirable to enable the government at all times to command the services of competent and skillful men. There is now no difficulty whatever in obtaining all the apothecaries required for the service, both afloat and ashore. For the service afloat during the year 1894, 119 applications were received, and during the year 1895, 62 applications.

In the year 1894 only four apothecaries were required on the first enlistment, and during the year 1895 only ten. During the year 1894 nine apothecaries re-enlisted, and in 1895, eight re-enlisted. The terms of service of but thirteen apothecaries will expire during the year 1896. Judging from recent experience, it is presumed that the majority of these will re-enlist. There are now a large number of applications on file, for examination and appointment.

The Department does not recommend the passage of the bill.

Very respectfully,

(Signed)

H. A. HERBERT, *Secretary.*

HON. J. D. CAMERON, *Chairman Committee on Naval Affairs.*

[COPY.]

TREASURY DEPARTMENT, WASHINGTON, *January 27, 1896.*

*To the Chairman of the Committee on Interstate and Foreign Commerce, House of Representatives:*

*Sir:* I have the honor to acknowledge the receipt of your letter of January 6th, enclosing bill H. R., 1663, providing for the appointment of pharmacists in the United States Marine Hospital Service, etc., and requesting that I furnish the Committee with such suggestions as may seem proper touching the merits of the bill, and the propriety of its passage.

In reply, I transmit herewith a copy of the Regulations of the Marine Hospital Service, on page 17 of which (paragraphs 50-61 inclusive), will be found the regulations concerning appointment, qualifications, compensation and allowances, grades, promotions, discipline and general duties of hospital stewards.

From these paragraphs it will be seen that hospital stewards are required to pass an

examination as to their general and special qualifications, and that their compensation is fixed by this Department. At present this compensation is as follows: For hospital stewards of the first class, \$40 dollars per month, with quarters, subsistence, fuel, light and water and laundering; after the expiration of one year they are promoted to the grade of second-class steward, with pay of \$50 per month, with the same allowances, and after one year's service they are promoted to the grade of third-class steward at \$60 per month, with the same allowances. When serving at stations where no quarters are provided, \$25 dollars per month as commutation of quarters is allowed, and when traveling under orders, they are allowed usual traveling expenses and transportation of 500 pounds of baggage.

Section 1 of the bill provides that the hospital stewards shall be called "pharmacists," and shall be warrant officers of the United States Marine Hospital Service.

With regard to the term "pharmacist," I have to state that the duties of the hospital stewards in the Marine Hospital Service cover a much wider field than is designated by this term. It is true that hospital stewards must be graduates of pharmacy, but the time consumed in actual pharmaceutical labor is limited, and would not warrant their employment for this duty alone.

Hospital stewards in the Marine Hospital Service, besides filling prescriptions, are obliged to have charge of property, records and correspondence, purchase and issue of supplies and general oversight of attendants. The United States Marine Hospitals are not provided with matrons, nor with hospital clerks. When the work is too great for one steward, two are assigned to a station. If these employees of the Treasury Department are by law designated as "pharmacists," the value of their services in other respects would be impaired.

Moreover, if hospital stewards are appointed by law to be "permanently attached to the Marine Hospital Service," "to continue during good behavior of the appointee," it will deprive the Department of the power discontinuing their service should necessity require a reduction in the number employed.

The same section provides that the hospital stewards or pharmacists shall be known as "warrant officers" of the United States Marine Hospital Service. I have to state that no such officers are known in the Treasury Department. It is not clear exactly what is meant by the term "warrant officer" in this bill.

Section 2 provides for the pay of said pharmacists. This section is objected to because it gives a newly appointed steward the same compensation as one who has served any number of years less than five, and does not provide for promotion as a result of satisfactory service, as is now provided by the regulations of the Marine Hospital Service. The matter of compensation of hospital stewards should be left to the Department, subject to such modification as may be necessary by reason of the condition of the fund from which they are paid.

There is nothing provided in this section which cannot be as well provided, and more properly, by regulation.

Section 3 provides for the examination before a board of officers of the Marine Hospital Service. This provision is practically in force at present under regulations; but, as these examinations must be held frequently, at remote points where only one marine hospital officer is stationed, to require a board to be summoned as provided by this section for said examination would entail additional and unnecessary expense.

Sections 4 and 5 are simply confirmatory of previous provisions of the bill, with the addition of provisions relating to order and precedence in the list, and to allowances, both of which are now fixed by regulations.

For the above reasons I am convinced that it would be detrimental to the interests of the Marine Hospital Service for this bill to become a law.

Respectfully,

S. WIKE, *Acting Secretary.*

The report of the War Department on our Army bill objects to changing the designation "hospital steward" to pharmacist, and gives the reasons for such objection. Hence, the Department of War raised so small an objection that it almost virtually endorses our bill. We do not object so seriously to the name hospital steward, if the man who is required by the Department to be a pharmacist to secure it, is given decent rank and pay, as such acknowledgment will be a great step onward.

The report of the Navy Department objects to giving the apothecaries the title of "pharmacist." It also objects to changing the status of the naval apothecary, as long as the Department can obtain the services of competent and skillful men under the present arrangement. Our fight is not against the retention of the name apothecary, although the Department already admits our point by requiring its apothecaries to be graduates in pharmacy, hence pharmacists. The Department does not wish to have the *status* of the naval apothecary changed. The Department must be aware that the naval apothecary has no status fixed by law. He is at the mercy of the regulations of every new Secretary of the Navy. It is for a status for him that we are working. The naval personnel bill, endorsed by the Naval Department at the last session of Congress, had embodied in it a clause to make apothecaries rank with pay-masters' clerks—that is, as an enlisted man at the beck and call of the medical officer, subject to discharge at any time by the medical officer. The paymaster handles large sums of money, and he naturally wishes his clerk absolutely under his control. The apothecary with such a status would be worse off than he is now, bad as that is. The Department desires no change as long as they can obtain skillful and competent men under the present rules. Are they so easily obtained? At a recent examination held in New York City, nineteen men were given permission by the Naval Department to be examined for positions as naval apothecaries. Only six appeared before the Board, and none of the six passed. Last June a board was ordered to convene on the U. S. R. S. Wabash at Boston, Mass., "for the examination of candidates for apothecary," but no candidates appeared and the board adjourned *sine die*. To what steps our government is forced to secure "the services of competent and skillful men" is evidenced by the character of some of the men in her service as apothecaries and hospital stewards. There are instances where *unnaturalized* persons are in the employ of our government working as pharmacists; there are other cases where parties only recently naturalized are serving our government in a similar capacity. Our service should certainly be made attractive enough in rank and pay to avoid the necessity of employing citizens of other countries when we have so many deserving ones of our own.

The report of the Treasury Department objects to the use of the name "pharmacist." It admits that they are required to be graduates in pharmacy, but goes on to state that their duties cover even a wider field than this. The report also objects to their being permanently attached to the Marine Hospital Service, as it will deprive the Department of the power of discontinuing their services when it desires to do so. Marine hospital stewards are usually assigned one to each hospital, and the number of hospitals is far more likely to be increased than to be decreased. It seems strange that the Department approves of permanency for the medical officers, but with far better reasons for the permanency of the man who has constant charge of the hospital (the hospital steward) it desires him to be at the mercy of any wish for change of those above him. Objection is also made to the pay of newly-appointed stewards being the "same as one who has served any number of years less than five, and does not provide for promotion as a result of satisfactory service." This objection virtually admits that they cannot get the best men to start with, but that they have to train them. The Navy Department in its report says there is no trouble in securing "competent and skillful men," which is correct.

The report also states that the compensation of hospital stewards should be left to the Department, subject to such modification as may be necessary. Why should marine

hospital stewards be thus left at the mercy of the Department any more than the medical officers? The hospital stewards have been left at the discretion of the Department for nearly one hundred years, and their condition is still a deplorable one. The best of them only secure \$720.00 a year, and yet the medical officers have had their salaries steadily increased from \$300.00 and \$500.00 until they now secure from \$1,500.00 to \$5,000.00 annually. The medical officers deserve all they secure, and certainly the hospital stewards, of whom so much is expected, are entitled to more than the pittance they now receive.

All three Departments require the apothecaries and hospital stewards to be pharmacists, and even graduates in pharmacy in the Naval Service, and yet require their medical officers to examine them as to their ability as pharmacists. It is strange they do not require them to be examined by the pharmacists already in the service, for medical officers are not pharmacists any more than pharmacists are physicians.

It would be difficult to enumerate the work which has been done, as the amount has been enormous, quite a number of the committee having sent out several hundred letters each, in their respective states. A number of voluntary contributions have been sent the chairman with which to prosecute this campaign of education. Without these funds much which has been done could not have been accomplished. In the work of the chairman directing the various efforts money was needed for printing, stenographer, typewriter, stationery and postage. From the office of the chairman over fifteen thousand personal letters have been sent out during the past year. To give some idea of our system of work, we append some specimen letters and to whom they were sent.

The following letter was sent to the pharmacists generally throughout the country, enclosing copies of our report of last year and also of a pamphlet containing our three bills and our arguments in their favor:

*Dear Sir:* We send you several copies of our report which was made to the Association at our last meeting. The two bills in our report both admirably expressed what we wished to ask. The bill in regard to the army was simply the present act changed to suit our wishes. Instead of presenting this we have decided that an amendment to the act now in force will be simpler and more readily understood. The amendment asks for exactly the same thing as the bill in our report. The bill in our report, bearing upon the Navy, was the proposed "Naval Hospital Corps Bill," changed to suit our views. After careful consideration we have thought it best to draft a bill simply asking for what we want, and not embracing other matters. However, if the gentlemen in charge of the "Naval Hospital Corps" legislation will accept our suggestions, the bill we first drew up will suit us. We have also drafted a bill for the Marine Hospital service. These three bills as we have sent them on to Congress are herewith inclosed. They are brief, to the point, and ask all that we can safely undertake at present.

With the three bills is an article setting forth the reasons for our requesting action of Congress. This brief summing up of the matter, it would probably be well to inclose with your letters to Senators, Congressmen and others to whom you write on the subject.

Think of the "*United States Pharmacist*," whenever you look at your watch. Let the twelve hours on its dial seem twelve flaming letters of appeal spelling, "U. S. P-H-A-R-M-A-C-I-S-T," and meaning "Us Pharmacists" also. This work is for better professional standing. Your duty to your business and yourself demands and urges you to write, write, write, as opportunity occurs, and secure support for our requested legislation.

Send our bills, and our reasons for them, to your most prominent men, pharmacists or otherwise, and write and urge them to write, to their Senators and Congressmen asking their support. Write to each of your Senators and Representatives yourself, and secure the same work of as many citizens of your state as you can. This is a great opportunity of giving our profession a step upward. This Committee will live in history if successful.

Let each of us put our shoulder to the wheel, and determine to win success, and it is ours. The Secretary of your State Pharmaceutical Association, we have no doubt, will willingly aid you.

A set of six letters was sent out to each Board of Pharmacy in the United States with the request that each member of the Board would sign them, and when signed that they be forwarded to the parties to whom they were directed. The letters written to the Secretary and the Surgeon-General of a Department were similar in character, but were only differently addressed. Those to Hon. Dan. S. Lamont, Secretary of War, and Geo. M. Sternberg, M. D., Surgeon-General of the Army, were as follows:

FEBRUARY 14, 1896.

*Dear Sir:* Among the various commands of the United States Army loca'ed throughout the country there are certain gentlemen designated as hospital stewards who do much pharmaceutical work for the officers, men, women and children. These gentlemen have no licenses as pharmacists, and are not even designated as pharmacists in the service, nor are they required to be graduates in pharmacy. We understand that they are not even examined as to their knowledge of pharmacy by pharmacists, but by medical officers who belong to another profession. This status of affairs is an unfortunate one in any State, and particularly in those having pharmacy laws which forbid the practice of pharmacy by any one not a pharmacist.

We would respectfully request that you give your hospital stewards the title of "pharmacists" and require the new ones to be graduates in pharmacy or to be examined by pharmacists, and not by medical officers, as medical colleges often do not teach pharmacy at all. The present condition of affairs is an unfortunate one, as the United States is now violating the pharmacy laws of nearly every State in the Union.

We learn that there is now a bill before Congress to rectify this matter, and we most earnestly ask you that you will favor its passage. It is House Bill No. 1662. Your support will be highly appreciated. With much esteem.

Yours sincerely,

STATE BOARD OF PHARMACY.

The letters to Hon. Hilary A. Herbert, Secretary of the Navy, and J. Rufus Tryon, M. D., Surgeon-General of the Navy, were somewhat similar, but worded differently to suit the conditions in the Navy. They were as follows:

*Dear Sir:* Among the various naval hospitals, shore stations and ships of the United States Navy there are certain gentlemen, designated as apothecaries, who do much work for the officers and men. These gentlemen have no licenses as pharmacists, and are not even designated as pharmacists in the service, yet they are required by the regulations to be most competent pharmacists. We understand that they are not even examined as to their knowledge of pharmacy by pharmacists, but by medical officers who belong to another profession. This status of affairs is an unfortunate one in any State, and particularly in those having pharmacy laws which forbid the practice of pharmacy by any one not a pharmacist.

We would respectfully request that you give the apothecaries the title of "pharmacists," as you already require them to be such in your regulations. We also request that you have them examined as to their ability by pharmacists, and not by medical officers, as medical colleges often do not teach pharmacy at all. The present condition of affairs is an unfortunate one, as the United States is now violating the pharmacy laws of nearly every State in the Union if its apothecaries are not pharmacists, and if they are pharmacists, you certainly ought to so acknowledge them. The present title is not a proper designation of the modern pharmacist.

The medical officer now secures from \$1,500 to \$5,000 annually, whereas less than one hundred years ago he received from \$300 to \$500. He is entitled to his improved

standing and salary. It certainly seems very fit to accord to the pharmacists in the service some recognition commensurate with their education and ability.

We learn that there is now a bill before Congress to place the naval pharmacists in a position in better accord with the dignity of their profession, and we most earnestly ask of you that you will favor its passage. Your support will be highly appreciated. We understand that there is also a bill to advance the rank of the naval medical officers. We would most respectfully ask that these two bills will both receive your approval. We certainly do not believe that you would approve the medical bill and not be willing to accord any relief whatever to pharmacists from their present degraded position in the service of the United States. The bill is House bill No. 1664, and Senate bill No. 1769.

Yours sincerely,

STATE BOARD OF PHARMACY.

The letters to Hon. John G. Carlisle, Secretary of the Treasury, and Walter Wyman, M. D., Supervising Surgeon-General of the Marine Hospital Service, were as follows;

*Dear Sir:* Among the various marine hospitals located throughout the country, there are certain gentlemen designated as hospital stewards who do a large amount of pharmaceutical work and have charge of others doing pharmaceutical work under them. These gentlemen have no licenses as pharmacists, and are not even designated as pharmacists in the service, nor are they required to be graduates in pharmacy. We understand they are not even examined as to their knowledge of pharmacy by pharmacists, but by medical officers who belong to another profession. This status of affairs is an unfortunate one in any State, and particularly in those having pharmacy laws which forbid the practice of pharmacy by any one not a pharmacist.

We would respectfully request that you give your hospital stewards the title of "Pharmacists," and require the new ones to be graduates in pharmacy or to be examined by pharmacists, and not by medical officers, as medical colleges often do not teach pharmacy at all. The present condition of affairs is an unfortunate one, as the United States is now violating the Pharmacy laws of nearly every State in the Union where marine hospitals are located.

The medical officer has been steadily advanced to positions in which he secures from \$1,500 to \$5,000 a year, whereas less than one hundred years ago he only received from \$300 to \$500. He has also been advanced to a higher rank. The medical officer is well entitled to his high titles and improved salary. The time is now most opportune for giving some professional recognition to pharmacy. Every other civilized country in the world, with possibly one exception, gives commissions to her pharmacists. We are not asking as much as this, but only a less degraded name and position than is now accorded the pharmacists in the marine hospital service. We learn that there is now a bill before Congress to rectify this matter, and we most earnestly ask that you will favor its passage. Your support will be highly appreciated. The bill is House Bill No. 1,663 and Senate Bill No. 1770.

Yours sincerely,

STATE BOARD OF PHARMACY.

After the bills were presented in Congress several thousand copies of the following letter were sent out to the prominent pharmacists of the Union and the response was most encouraging:

*Dear Sir:* There are three bills now before Congress, having been introduced both in the House and Senate, in regard to the status of pharmacists in the Army, Navy and Marine Hospital Service of the United States. Anything that you can do towards forwarding these bills will be for the advancement of our profession. The present rank and pay of hospital stewards and apothecaries in the service of the United States is in no way commensurate with the ability and education required, and is also an insult to the profession of pharmacy. Please write to each one of your Senators and Congressmen in the

interest of the bills, and also to the heads of the Departments of the Treasury, War and Navy.

A favorable report from the Departments will secure the passage of *our* bills, as we have many votes promised. Hon. A. O. Bacon, of the Senate, and Hon. Chas. F. Crisp, of the House, have charge of the bills. If we expect pharmacy to attain its proper position in this country, every one of us must work for it. Even the veterinary surgeons in the army are better paid than the hospital stewards, and they are now very properly moving for still better recognition. The sail-makers have far better rank and pay in the navy than the apothecaries of whom so much is required. *You* and the balance of us must show that we have a profession if we are to expect the public to believe. *We* may think that we are of some importance, but we certainly cannot expect others to think so when we supinely submit to hospital stewards and apothecaries occupying such menial and degraded rank in the Army, Navy and Marine Hospital Service of the United States. Where would the medical profession of this country have been to-day if they had dumbly stuck to their trade and not demanded proper recognition? The time has been when the barber and the surgeon were the same, and less than a hundred years ago the medical officers in the United States service secured only from \$300 to \$500 per year; they now are given from \$1,500 to \$5,000 annually. It behooves the pharmacists to be less inert. Your active support can accomplish much. Will you promptly ask these gentlemen to support our bills?

The Heads of the Departments and the committees to whom the bills have been submitted are as follows:

Hon. John G. Carlisle, Secretary of the Treasury.

Walter Wyman, M. D., Snpervising Surgeon-General, Marine Hospital Service.

Hon. Daniel S. Lamont, Secretary of War.

Geo. M. Sternberg, M. D., Surgeon-General U. S. Army.

Hon. Hilary A. Herbert, Secretary of the Navy.

J. Rufus Tryon, M. D., Surgeon-General U. S. Navy.

#### SENATE.

*Committee on Military Affairs.*—Hawley, Jos. R., Conn., Chairman; Proctor, Redfield, Vt.; Shoup, Geo. L., Idaho; Sewell, Wm. J., N. J.; Warren, F. E., Wyoming; Elkins, Stephen B., W. Va.; Bate, Wm. B., Tenn.; Cockrell, Francis M., Mo.; Palmer, John M., Ill.; Mitchell, John L., Wis.; Walthall, Edward C., Mo.

*Committee on Naval Affairs.*—Cameron, Jas. D., Pa., Chairman; Hale, Eugene, Me.; Perkins, Geo. E., Cal.; McMillan, Jas., Mich.; Chandler, Wm. E., N. H.; Dubois, Fred T., Idaho; Blackburn, Jos. C. S., Ky.; Gibson, Chas. H., Md.; Smith, Jas., Jr., N. J.; Bacon, A. O., Ga.; Tillman, Benj. R., S. C.

*Committee on Commerce.*—Frye, Wm. P., Me., Chairman; Jones, John P., Nev.; Quay, Matthew S., Pa.; McMillan, Jas., Mich.; Squire, Watson C., Wash.; Elkins, Stephen B., W. Va.; Nelson, Knute, McBride, Geo. W., Oregon; Vest, Geo. G., Mo.; Gorman, Arthur P., Md.; White, Stephen M., Cal.; Murphy, Edward, Jr., N. Y.; Berry, Jas. H., Ark.; Pasco, Samuel, Fla.; Caffery, Donelson, La.

#### HOUSE.

*Committee on Military Affairs.*—John A. T. Hull, Ia., Chairman; Newton Martin Curtis, N. Y.; Benjamin F. Marsh, Ills.; Ephraim M. Wooster, Pa.; Michael Griffin, Wis.; George N. Southwick, N. Y.; Richard W. Parker, N. J.; Roswell P. Bishop, Mich.; Lucien J. Fenton, O.; John P. Tracey, Mo.; John C. Tarsney, Mo.; D. Gardiner Tyler, Va.; George B. McClellan, N. Y.; Joseph E. Washington, Tenn.; James A. Lockhart, N. C.; Thomas B. Catron, N. M.

*Committee on Naval Affairs.*—Charles A. Boutelle, Me., Chairman; John B. Robinson, Pa.; George W. Hulick, O.; Samuel G. Hillborn, Cal.; Melville Bull, R. I.; J. Frank Hanly, Ind.; Francis H. Wilson, N. Y.; George E. Foss, Ills.; Alston G. Dayton, W. Va.; Amos J. Cummings, N. Y.; Adolph Meyer, La.; Hernando D. Money, Miss.; Uriel S. Hall, Mo.; Farish Carter Tate, Ga.; Joseph J. Hart, Pa.

*Committee on Commerce.*—William P. Hepburn, Ia., Chairman; Loren Fletcher, Minn.; James S. Sherman, N. Y.; Irving P. Wanger, Pa.; Wm. H. Doolittle, Wash.; Thomas Settle, N. C.; J. Frank Aldrich, Ills.; Charles F. Joy, Mo.; George H. Noonan, Tex.; John B. Corliss, Mich.; Charles G. Bennett, N. Y.; James F. Stewart, N. J.; Andrew Price, La.; Josiah Patterson, Tenn.; Franklin Bartlett, N. Y.; Harry Welles Rusk, Md.; Tazewell Ellett, Va.

We only give these specimen letters to illustrate in a brief way some of the work done. Many, many, other letters were written urging active work upon our brother pharmacists. Letters requesting active co-operation and showing what we wished done were written to the President of every Pharmaceutical Association; the Secretary of every Pharmaceutical Association; every College of Pharmacy; every Naval Apothecary; every Army Hospital Steward; every Hospital Steward in the Marine Hospital Service; the leading Pharmaceutical Periodicals; many Daily Papers; the whole membership of the American Pharmaceutical Association, and to many thousands of other pharmacists of the United States.

Every one seemed willing and anxious to help in the good work. The State Pharmaceutical Associations in most instances not only endorsed our work, but appointed the member of our committee from each state as chairman of a state committee represented by a committeeman from each congressional district. There have been sent out over fifteen thousand letters during the year to the various workers, and it would be a very moderate estimate to say that over one hundred and fifty thousand letters have been received by congressmen as the result of our labors.

In the midst of our work in behalf of our bills, we learned that the naval personnel had been again presented to this congress, and one of its provisions was to make the present apothecaries of the navy rank only as paymaster's clerks. This was an attempt to degrade the pharmacist still further. Our committee actively united in protesting against such unjust treatment, writing each member of the Naval Committee, the Secretary of the Navy and the Surgeon-General of the Navy in strongest terms, urging them not to put this indignity upon us, and to change the reading of the Naval Personnel bill so as to make naval apothecaries rank as warrant officers. This we succeeded in having accomplished. So if the Naval Personnel bill passes, we will secure in it virtually all we asked in our own bill for the naval apothecaries. The following letters to Surgeon-General explain our position in regard to this matter:

J. R. TRYON, M. D., *Surgeon-General U. S. Navy, Washington, D. C.*

*Dear Sir:* Your report for 1895 received. Many thanks for the same. We regret that you have suggested such an anomalous position as a rank of paymaster's clerk for pharmacists in the navy. It is what might be called an Irish promotion; while an officer as far as uniform and messing is concerned, it seems to us in fact no status at all, as he would be entitled to no consideration for length of service in any retirement act either for officer or man. When the paymaster comes home from sea the clerk has simply to hunt for a job, which may be for six months or may not be for a year. This would tend to make the service much more undesirable than at present. You suggest that the pharmacist be an enlisted man with "the same relative position as paymaster's clerk."

The pay-clerk is a sort of semi-civilian, having the relative rank of ensign and liable to discharge at any time. A paymaster may take his clerk with him wherever he goes if he wishes to do so. Should a new paymaster come to the ship and bring his clerk with him, the present incumbent would merely be discharged from the service, which arrangement is well enough, considering the amount of money the clerk handles for the paymaster, and it is but natural that the latter should desire personal acquaintance with and confidence in the former. This is not the case, however, in the Medical Department; but, on the other hand, under such an arrangement the pharmacist would hold the same relative rank as, and be the social equal of an assistant surgeon, his superior officer. Such a position would be relished neither by the assistant surgeons nor the pharmacists as enlisted men; besides, the pay would be much less than that allowed warrant officers. In a word, it would be in a way a trifle higher position, but one commanding less respect from the men, besides being somewhat anomalous, as suggested.



We speak for those thoroughly familiar with the profession of pharmacy, and in the name of the 150,000 pharmacists throughout the country who unanimously endorse our work, we beg you to accord the pharmacists in the service of the United States at least an equal rank with the carpenters and sail-makers. We have enclosed a little pamphlet on the subject, and a careful consideration of the matter by you is requested.

We ask of you that you change your bill so as to make pharmacists warrant officers, and the equal of the carpenters and sail-makers.

As a professional man we believe that you will take pleasure in doing anything to advance a profession so closely in touch with that of medicine. If you will change your bill in regard to the naval hospital corps so as to meet our views in regard to warrants, we would esteem it most highly and labor most energetically for the successful passage of the whole bill; otherwise, if the pharmacists are put in the awkward position which you suggest, much as we regret it, we will be compelled to fight such unfair legislation. We have many promises for support throughout the various States of the Union.

Hoping that you may see fit to incorporate this act of justice (the giving warrants to naval apothecaries) in your bill, we remain, etc.

We feel most hopeful of securing favorable legislation at the coming session of Congress. We must convince Congress and the people of the justness of our requests, and we will win. To secure the attention of so many, however, is expensive work.

We feel that the three surgeon-generals are thoroughly convinced of the justice of our cause. Dr. Tryon, of the navy, wrote us most satisfactorily as early as December 30th, 1895. We would give a copy of his letter were it not a personal one. Drs. Sternberg and Wyman have also written favorably, and we give copies of their letters. Dr. Sternberg wrote us on February 28th, 1896, as follows:

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE, }  
WASHINGTON, February 28, 1896. }

DR. GEO. F. PAYNE, *Chairman of Committee, Atlanta, Ga.:*

*Dear Sir:* Your letter of February 26th is at hand. I am disposed to think that pharmacists have been led to introduce the bill in question under a misapprehension with reference to the position and duties of hospital stewards. I am receiving numerous letters from members of your committee and others urging me to endorse the bill introduced, which, for reasons already stated, I do not approve of. To show how very much mistaken some of the gentlemen are who are urging this legislation, I quote from a letter received this morning: "I am told the apothecary now ranks about the same as a stable boy. I am disgusted with this. I do not see how the Government can allow such a state of affairs." Now, as a matter of fact, the hospital stewards of the army occupy a very responsible position, and are very highly respected both by the officers and the enlisted men. They are not appointed simply for the purpose of dispensing medicines, and are in no sense apothecaries. Very commonly the acting hospital steward, who is ambitious to attain the position of hospital steward, does the dispensing. The steward himself is occupied largely with other responsible duties relating to the administration of the post hospital, etc. Moreover, we do not require an expert pharmacist to dispense the medicines supplied for use in the army. The tinctures, fluid extracts, etc., are purchased ready-made, and we use, very extensively, compressed tablets and pills, which call for no expert knowledge in preparation. It is for this reason that an intelligent and careful man, who has enlisted as a private in the hospital corps of the army, is able to fit himself for the position of acting hospital steward, although he may not previously have had any knowledge of pharmacy. He is instructed in reference to the preparation and dispensing of such medicines as are upon the army supply table, and after having proved himself competent by a practical test made in the dispensary of the post hospital, having passed a rigid examination as to his knowledge of drugs and of the elementary branches of an

English education, he may be detailed as an acting hospital steward. In this position he may serve for a year or more until a vacancy occurs, when, if he is successful in passing a competitive examination, he is appointed a hospital steward. We have plenty of good men who are anxious to secure these positions in the way indicated, and a graduate in pharmacy could not be appointed a hospital steward without first enlisting as a private in the hospital corps, and proving not only his ability to prepare and dispense medicines, but also his character as to sobriety and reliability, his capacity for controlling men, and general adaptability to the military service. Our method is satisfactory and our hospital stewards, as a rule, are competent and reliable men, although but few of them are graduates in pharmacy. So far as I know, they are not dissatisfied with their present pay and position, which the majority of them would be very reluctant to give up. No doubt they would like an increase in pay, and if Congress is disposed to be more liberal with them in this regard, I should be very glad to see legislation to that effect. I would, therefore, suggest that your effort be limited to an attempt to obtain increased pay for the hospital stewards of the army. In my opinion, there is no reason for changing their title and status.

I will send a copy of this letter to the Chairman of the Military Committee of the Senate and the House of Representatives.

Very truly yours, GEO. M. STERNBERG, *Surgeon-General U. S. Army.*

*Copy.*

Dr. Sternberg is in favor of the increased pay, but does not seem to be impressed by the ability of a man who is able to dispense the prescriptions of the army medical officers, detect their errors, and perform their duties during their absence. Dr. Wyman, of whom we expected much, has been slow in giving us a single crumb of encouragement. The position of the marine hospital steward appeared so preëminently unjust that we decided to write to President Cleveland and the Civil Service Commission in regard to the matter, as stated above. This we did with much success some time ago, the Commission promptly laying our letter before the President, requesting favorable action on the same. The following letter from the Commission shows the success of our work:

DR. GEORGE F. PAYNE, *Chairman Committee of American Pharmaceutical Association, Atlanta, Ga.:*

*Sir:* You are informed that the President at the time he approved a revision of the civil service rules which went into effect May 6, 1896, included in the departmental service all positions in the Marine Hospital Service that are not subject to nomination by the President and confirmation by the Senate, and those places filled by persons merely employed as laborers or workmen. This act upon the part of the Executive included hospital stewards. Subsequently, on June 13, 1896, by direction of the President of the United States, the Secretary of the Treasury issued a circular relative to civil service classification in the Treasury Department. That circular completed the President's order, and classified 23 hospital stewards at a compensation of \$720 a year, 3 at a compensation of \$600 a year, and 6 at a compensation of \$400 a year, or a total of 32 hospital stewards whose annual compensation is \$21,240.

Since these 32 hospital stewards were in the service at the time that the rules were approved, they are subject to the provision of the rules which provides that a person holding a position on the date said position is classified under the civil service act shall be entitled to all the rights and benefits possessed by persons of the same class or grade appointed upon examination under the provisions of said act. As vacancies occur in that grade of employes hereafter, they will be filled from eligible lists of the Commission. The examination to show tests of fitness for this grade of employes has not yet been prepared. The board of examiners will probably be selected from among the officers of the Marine Hospital Service. The tests of fitness will be settled in a conference between

the Commission and the Surgeon-General of that service. The needs of the service alone will be considered.

Very respectfully,

[Signed], JOHN T. DOYLE, *Secretary*.

A letter was recently addressed to all three Departments requesting the number of unnaturalized persons, the number of naturalized foreigners, and the number of negroes or mulattoes serving as apothecaries and hospital stewards in the three Departments.

From the War Department we learned that there are 106 hospital stewards and 95 acting hospital stewards now in the service, but that no record had been kept previous to August 1, 1894, as to the number of unnaturalized persons or the number of naturalized foreigners serving in such capacity. Since August 2, 1894, only four new ones have been enlisted, two being citizens of the United States and two having declared their intention to become citizens. Hence, enlistments since August 2, 1894, have been fifty per cent. foreigners. Our government should certainly make its hospital stewardships desirable enough to be able to fill the positions with American citizens.

From the Navy Department we learned that the clerical force at their disposal was too limited to comply with our request. We have been informed, however, that there are men serving as U. S. naval apothecaries who are not American citizens.

The Treasury Department wrote us that there were eight *naturalized* citizens serving as hospital stewards, in the marine hospital service. As there are only about thirty marine hospital stewards, this makes the service composed of about twenty-five per cent. of foreigners. The service does not appear attractive to those native born Americans who have been educated in the United States.

We have recently received a letter from Dr. Wyman, Supervising Surgeon-General of the Marine Hospital Service, in which occurs the following:

"Referring to the matter of the position of hospital stewards in the Marine Hospital Service, which has been the subject of previous communications from you, I wish to state that while the bill which was presented was objectionable as set forth in the letter of the Acting Secretary of the Treasury, addressed to the Chairman of the Committee on Commerce in the United States Senate, which was published in the Congressional Record of February 20, 1896, a copy of which you have without doubt in your possession, still the subject is one which is receiving my serious consideration, with a view to bringing about a more satisfactory regulation with regard to their compensation.

"Respectfully yours,

(Signed) WALTER WYMAN,

"*Supervising Surgeon-General, M. H. S.*"

This is certainly encouraging news for those who have battled so faithfully for the improved status of our government pharmacists.

The mail carriers of the United States receive an annual salary of \$1,000 and only work eight hours a day. Many of these men can barely read and write. In the south these letter carriers are principally negroes, and if our government can pay \$1,000 annually for eight hours' labor for such service as they are capable of giving, it is certainly a great injustice to force well educated hospital stewards to be practically on duty for twenty-four hours for the pittance which they receive. We have no desire to interfere with any one now in our government service, but we certainly are most anxious to see the positions of hospital stewards and apothecaries made desirable enough to attract competent American pharmacists.

The Chairman has been in receipt of a number of contributions in cash from those who are interested in our campaign of education. These funds were all sent voluntarily, without any solicitation on his part. The amounts received to date have been as follows:

From those interested in the Naval Apothecaries.....	\$280 00
“ “ “ “ Marine Hospital Stewards.....	75 70
“ “ “ “ Army Hospital Stewards .....	80 00
Total .....	<u>\$435 70</u>

Funds were expended by the Chairman as follows:

Printing .....	\$147 40
Carbon Paper.....	2 10
Mailing Tubes .....	2 00
Paper .....	50
Express .....	2 25
Postage .....	103 58
Stenographer .....	225 45
Typewriter .....	40 00
Envelopes.....	10 00
Total .....	<u>\$533 28</u>

The expenses of the Chairman up to date have been \$97.58 in excess of receipts from contributions.

We have certainly already met with considerable success in the work which has been given in our charge. Much good has been accomplished, and the future looks bright with hope for all three branches of the government service. "The sinews of war" are most necessary in such a work. Money is needed for conveying letters and transmitting information and ideas to and fro. In Congress and the departments there are over four hundred gentlemen to be informed and impressed in regard to our work, and there are 150,000 pharmacists who should be enthused into a proper interest and activity in our campaign.

There is a field of labor now stretching before us as a profession in which each must do his utmost, that American pharmacy may receive that recognition which it so richly deserves. Let each pharmacist in the United States consider himself one of our committee, and with the active persistent work of all success is sure.

We will try to bring our bills to the next session of Congress, which convenes in the early portion of December next. Early in December be sure to write to the Secretaries and Surgeon Generals of the Departments, to the committees, and to your Congressmen, in regard to the matter, with briefly asking their support. With the hearty co-operation of all, and a long pull, and a strong pull, and a pull all together, we will win.

Respectfully submitted,

GEO. F. PAYNE, *Chairman, for the Committee.*

It was moved by Dr. Stewart that the thanks of the Association be extended to this Committee, and that the report just read be approved and referred to the Publication Committee.

The motion was seconded and carried.

MR. EBERT: If we can just say a word on this Report, I would like to throw out a suggestion to the Committee, and that is this: Now that we have, so to say, the assistance of the pharmacists of the country in this matter, would it not be well to make an effort to have the medical profession aid us in our work? Would it not be well that the American Medical Association be asked to co-operate with us? The medical profession have always expressed and do express sympathy with the pharmacists, and yet we see that certain members of the medical profession, when they are in power, as they are in the Army and Navy and Marine Hospital Service, do not seem to be very kindly disposed

toward us. Now would it not be a good move to get the co-operation of the American Medical Association in this work? Could we not induce that Association, representing the medical profession of the country, to aid us in obtaining our just rights in this respect? I simply throw that out as a suggestion to the Committee.

DR. PAYNE: I accept Mr. Ebert's suggestion as most admirable. The only reason that we have not taken steps in that direction is that it costs a great deal of money to cover the United States with mail matter.

MR. DOHME: I would suggest that our delegates to the American Medical Association bring this matter before that body, and get an expression before the next annual meeting of this Association.

MR. ALPERS: As I understand the Chairman of this Committee, they intend to bring in a bill at the next session of Congress. Now, the Medical Association does not meet till next year, so that it would be a little late unless they fail at the next session. Of course then a new effort might be made, but for the present the American Medical Association cannot be appealed to.

THE PRESIDENT: Undoubtedly this Committee will be continued, and the Chairman of the Committee can make note of all the suggestions, and act upon them. All that is necessary for him to act is the mere suggestion.

MR. BARTELLS: I would like to ask with regard to the status of the pharmacists in Canada. This matter belongs to the United States, and I am ignorant of the condition of things here. Ought that to apply to both countries, or are they already in a proper condition?

DR. PAYNE: In regard to that view of the question, it is one that I have often thought of, and feel that the stigma that our apothecaries among the English-speaking people are the only apothecaries in the world that have not commissions. But as I understood my resolution, when I offered it at Asheville, it referred to the pharmacists in the service of the United States. Now, if the resolution be offered in regard to the service of England, I think our friend upon my left would be a good man to make chairman of that Committee, and we would co-operate.

THE SECRETARY: I think the matter of apothecaries in Her Majesty's service had better be left to the consideration of Her Majesty's subjects; and I do not think we should introduce anything pertaining to the pharmaceutical service of England into our Association. We are endeavoring to obtain legislation for the apothecaries of the United States in the service of the United States; and while the American Pharmaceutical Association is broad enough to cover the Canadian Provinces, I think it was never intended to offer suggestions or to ask for legislation at the hands of the Queen.

DR. WHELPLEY: In listening to this address, I could not help but be impressed with the general recognition which the Chairman gave to the various members of the Committee for the work they have done. Now, I feel it would be an injustice if we passed by this opportunity to recognize among ourselves that a question which has been before us for many years without any practical results being accomplished, has at last been brought to a focus by a man who appears among us, takes the work in hand, and places it in shape. Now, it is fortunate not only for the American Pharmaceutical Association, but for the profession of pharmacy in the United States, that we have, in the language of one of our members, discovered Dr. Payne; and I am thankful that he is still with us to prosecute the work to the end. (Applause.)

The Secretary read several communications from apothecaries in the ser-

vice of the United States, showing their appreciation of the work of this Committee, and was instructed to acknowledge receipt of these communications.

U. S. R. S. VERMONT, NAVY YARD, NEW YORK, *August 7, 1896.*

*Gentlemen:* We the undersigned naval apothecaries desire to tender sincere thanks for the very active interest taken in our cause by the American Pharmaceutical Association as a whole, and for the strenuous and continued efforts made in our behalf during the present year by Dr. George F. Payne, his committee, and by individual members.

Trusting that the large amount of work already accomplished may ultimately be crowned with success, we remain,

Very truly yours,

CHAS. E. REYNOLDS,  
EDWARD MAY,  
PAUL J. WALDNER,  
WM. H. MYERS,  
JOSEPH MCMAHON,  
S. G. LANIER.

*The President and Members, American Pharmaceutical Association, Montreal, Can.*

U. S. NAVAL STATION, NEWPORT, R. I., *August 10, 1896.*

PRESIDENT JAMES M. GOOD, *American Pharmaceutical Association:*

*Dear Sir:* The pharmacists in the government employ, attached to the naval branch of the United States service, desire to have conveyed through you to the members of the American Pharmaceutical Association, their appreciation of the efforts which that body is making towards securing status and pay for our corps commensurate with attainments demanded.

The number of pharmacists in the United States Navy is small at the best, and as a large proportion of this number are scattered over all parts of the world on cruising ships, it is evidently impossible to get them together for concerted action, and therefore as fully impossible to have ever made any practical headway toward legislation in their behalf without the assistance of such an organization as the American Pharmaceutical Association, which has so heartily come to the front in this matter, and conducted the fight for us in the most admirable manner.

For over twenty years now the apothecaries in our navy have, from time to time, endeavored to gain some recognition from Congress, but without success. No bill for our advancement has as yet become a law, but through the energetic work of Dr. George F. Payne and the Committee of which he was Chairman, and the co-operation of the Association as a whole, there has been a clause inserted in the bill for the re-organization of the navy which, if passed, will, I understand, give the reform in this direction which is asked for. This great stride towards success is due without doubt to the wide-spread influence which the Association was enabled to, and so kindly did, assert in behalf of the military pharmacist, and we are deeply grateful for the work they have done, and trust they will feel warranted in continuing their assistance until the success is assured of the object which they already have placed in such an enviable position for legislation.

Yours very sincerely,

W. H. HUNTINGTON,  
JOHN A. WOOD,  
EDWARD P. HARRISON,  
*Apothecaries U. S. Navy.*

The Report of the Committee on Weights and Measures was then read by Mr. F. G. Ryan, the Chairman.

REPORT OF THE SPECIAL COMMITTEE ON WEIGHTS AND MEASURES,  
APPOINTED BY THE PRESIDENT.

*To the President and Members of the American Pharmaceutical Association.*

The Special Committee on Weights and Measures was appointed by the President for the purpose of carrying out certain resolutions adopted at the Denver meeting of this Association, having for their object the passing of such laws, in the United States, as would make the Metric System the legal system of weights and measures.

The resolutions passed by this Association directed that the work of the Committee should be largely done through the State Pharmaceutical Associations. This was found impossible by the Committee, as the State Associations could take no action until their annual meetings, which were not held until after the session of Congress at Washington had adjourned.

The Committee, however, were able to do much valuable work, and succeeded in having several hundred petitions sent to members of Congress, asking a favorable consideration of the bill before the House of Representatives providing for the adoption of the Metric System; it secured the publication of a number of editorials in the daily press of the larger cities favoring the adoption of the measure, and also the passing of resolutions by many Colleges and Schools of Pharmacy, the American Medical Association, and other organizations. Since the adjournment of Congress a large number of State Associations have adopted resolutions favoring the use of the Metric System.

Arrangements were made to appear before the Committee on Coinage, Weights and Measures, having the bill in charge, when information was received that a favorable report would be made to Congress, and a personal appeal was therefore unnecessary.

On March 16, 1896, Hon. Charles W. Stone, Chairman of the Committee on Coinage, Weights and Measures, made a carefully prepared and favorable report on House Bill 7251, which was substituted for the original bill introduced by Hon. D. M. Hurley, and differed from the same principally in exempting from the provisions of the bill the survey of public lands.

By very earnest efforts on the part of Mr. Stone, the Committee on Rules of the House of Representatives set aside a day for the consideration of the bill, and on April 7, 1896, it was taken from the calendar. After spending portions of two days in debate, the bill was passed to a third reading by a vote of 119 to 116. Upon motion of Mr. Dockery, who changed his vote from nay to yea, a reconsideration of the vote was ordered, and finally, upon motion of Mr. Stone, the bill was re-committed to the Committee on Coinage, Weights and Measures.

The bill, therefore, is now in the hands of the Committee on Coinage, Weights and Measures, and may be taken up by Congress at such time as the Committee on Rules may think proper to give it further consideration.

The friends of the measure have every reason to feel encouraged at the progress made. Where a few years ago it was impossible to obtain for the Metric System serious consideration by Congress, at the session above referred to the bill making it a law was actually passed by the House of Representatives, and only by parliamentary proceedings was its final adoption delayed.

The Chairman of your Committee has the assurance of the Chairman of the Committee on Coinage, Weights and Measures of the House of Representatives, as well as that of prominent members of Congress, that the bill will again be brought forward at the first opportunity, and that nothing will be omitted that will aid in finally making the bill a law.

As the character of the opposition to the bill, your attention is directed to the Congressional Record of April 7 and 8, 1896, giving the arguments for and against the bill, those opposed to the measure either admitting or plainly showing by their speeches that they knew little or nothing about the subject under consideration—one member from

Virginia asking how they were to measure whiskey, as there appeared to be no wet measure in the system.

Your Committee would recommend that this Association continue its efforts to secure the adoption of the Metric System, believing that a successful result will be reached in the near future. It is very desirable that the members of the Association, as individuals, should aid in every way possible the securing of the desired result, thus conferring a lasting benefit upon generations yet unborn. The Chairman would recommend that a new committee be appointed or the old one be continued—as the Association may think best—to carry on this work in the future.

F. G. RYAN, *Chairman*.

Mr. Hallberg moved that the report be received, adopted, and referred for publication, which motion was seconded and carried.

MR. ALPERS: I would like to make a few suggestions in reference to this matter. I would prefer not to put it in the form of a motion, but wish to call the attention of the members of this Committee, and also of the members in general, to the fact that this matter before Congress affects not only pharmacists, but also other interests, grocers and so on. Now would it not be advisable to get their support for this? If the wholesale grocers could be interested, they could materially assist us. On the other hand, if they should oppose it, it would be an enormous obstacle, and such a one as perhaps we would not be able to overcome, as their interests are larger than ours.

MR. RYAN: I would say that this matter has been looked into very thoroughly, and great aid has been received from exporting and importing merchants. Communications have been received by me personally from a number of the large houses, showing their disposition to co-operate with us in the work of having the Metric System adopted. There seems to be very little, if any, opposition that I can discover, except by those who have not given the Metric System the least bit of study or consideration.

MR. HALLBERG: I would simply like to make a statement in order to get it in the records, that a month or two ago the Metric System became compulsory in Mexico. That leaves no Central or South American state not using the Metric System, I believe, with the exception of Guatemala.

The report of the Committee on Transportation was next presented and read by the Secretary at the request of Mr. Morrison.

*To the American Pharmaceutical Association:*

Your Committee on Transportation beg to report that the following passenger associations granted our request for reduced fares, viz.: one and a third fare for the round trip to Montreal and return:

The Trunk Lines Association, Central, Southern & Western Passenger Association.

We were unable to make any arrangements with lines west of the Rocky Mountains.

The extension of time for the meeting to two weeks, in accordance with the amendment adopted at Denver, will be of great advantage to the members, as they will practically have ten days after the meetings to take in the usual side trips from places of meetings.

Your Committee would respectfully recommend the following changes in Article x, Chapter ix, of the By-Laws: Strike out the words "and Chairman thereof," and add the words, "Unless otherwise specially arranged for by the Committee, the Chairman of this Committee shall be the member residing nearest to the place of meeting," so that Article x shall read: "The Committee on Transportation which shall be selected by the Council shall consist of one member each from the cities of Boston, New York, Chicago, St,



Louis, Cincinnati, New Orleans, Atlanta, St. Paul, Denver and San Francisco, and in conjunction with the Local Secretary, who shall be a member of the Committee, shall arrange for transportation from the different sections of the United States and Canada to the place of meeting and return.

Unless otherwise specially arranged for by the Committee the Chairman of this Committee shall be the member residing nearest to the place of meeting.

The whole respectfully submitted,

JOS. E. MORRISON, *Chairman*.

Upon motion of Mr. Ryan the report was received and referred for publication.

The Secretary on behalf of the Committee on the Centennial Fund stated that there was no report to make, as no request for money from that fund had been made during the past year.

The President next directed the Secretary to read those portions of the report of the Committee on the President's Address not yet approved, so that action might be taken thereon.

The Secretary having read the first section of the report pertaining to the continuation of the Special Committees on the Status of Pharmacy in the Army and Navy and on Metric Weights and Measures (see p. 58) it was moved by Dr. Stewart, seconded by Mr. Ebert, that the same be adopted. Agreed to.

MR. RYAN: I would like to make an inquiry. Would that necessarily involve the holding of the last-named Committee to the resolutions passed at Denver, or would they be at liberty to do the work in their own way.

THE PRESIDENT: Would you please state more specifically what these resolutions were?

MR. RYAN: The point is this: The resolutions directed that we should do the work through the State Pharmaceutical Associations, and it is utterly impossible to do that, because the meetings do not occur at one time. If you write they simply say: "We can take no action until our annual meeting." That has been the great trouble, but we had to take the bull by the horns and do what we could under the circumstances. I think it would be better if the Committee could work in its own way, provided it did not spend a great deal of money.

THE PRESIDENT: Now, if you have something to suggest by way of modification, it would be well to do so. These committees should not be handicapped. We have good chairmen at the head of these committees, and a certain amount of liberty should be given these gentlemen.

Mr. Alpers moved that the Committees be allowed to proceed independently of previous instructions, which motion was seconded and carried.

The second section of the report (see p. 59) was then read by the Secretary, and its adoption moved by Dr. Whelpley.

THE PRESIDENT: The subjects embraced in that recommendation are the publication of a table of doses in the Pharmacopœia and the recognition of a selected list of synthetic remedies. We do not adopt these recommendations at this session, but refer them both to the next meeting of the Association.

**THE SECRETARY:** It says that prominent notice of this shall be given to each member. Now, the question is whether it would not be better in the annual notice of meeting to refer to it especially that these subjects would come up for discussion.

**MR. DIEHL:** Any way the Association sees fit to give it prominence.

**MR. HALLBERG:** I would like to offer an amendment to that, by referring it to the various committees on the Revision of the Pharmacopoeia, and to the State Associations. I offer that as an amendment to the recommendation.

I would like to say that we ought to set up as many subjects as we can for the standing committees of the various State Associations, and matter of this kind would be very acceptable, and I believe many of them would act upon them.

**THE PRESIDENT:** If the Committee accepts the suggestion of Prof. Hallberg, it will be made part of the recommendation.

**MR. DIEHL:** We will accept it.

**THE PRESIDENT:** The Chairman accepts the suggestion of Prof. Hallberg, and it becomes part of the recommendation.

The motion to adopt the second section as amended was then carried.

The Secretary next read the third section of the report (see p. 59), referring to the continuation and enlargement of the Committee on National Legislation, which was adopted after it had, upon motion of the Secretary, been agreed to enlarge the committee to five members.

The fourth section of the report (see p. 59) bearing upon tax-free alcohol was read, and, upon motion, adopted, the appointment of the Committee named being left to the incoming President.

The following resolution proposed by Mr. Hallberg, was, upon motion, adopted.

*Resolved,* That the President of this Association appoint a committee of five to collect facts concerning the use of alcohol by pharmacists as covered by the recommendation in the President's address, and to present such data to the Committee chosen by the United States Senate for report to the next Congress.

The fifth section of the report having been previously acted upon, the whole report of the Committee as amended, was, upon motion of Mr. Kennedy, adopted.

Mr. Sheppard presented the following resolution, which having been seconded by Mr. Ryan, was adopted :

*Resolved,* That it is the sense of this Association that such laws should be enacted by the Congress of the United States as will change the present laws, rules, and regulations, in regard to medicinal copyrighted and trade-mark preparations, which laws and rules are now so interpreted that the citizens of the United States are a prey for the whole world, Germany and its agents taking millions out of this country without return.

The following communication from the Nebraska State Association was read by the Secretary :

TECUMSEH, NEB., June 11, 1896.

*Mr. Charles Caspari, Secretary American Pharmaceutical Association :*

*Dear Sir :* Enclosed please find copy of resolution adopted by the Nebraska State Pharmaceutical Association at its fifteenth annual convention in session at Lincoln, Nebraska, June 2nd, 3rd and 4th. Yours truly,

[SEAL.]

W. L. HEILMAN, *Secretary A. S. P. A.*

"By the Nebraska State Pharmaceutical Association now in session be it

*Resolved*, That it is the sense of this body that greetings be sent to the American Pharmaceutical Association, and that your body be respectfully requested to meet in Omaha in the year 1898, that being the year when the trans-Mississippi Exposition is to be held in Nebraska's metropolis."

MR. MAYO: We have a great many attractions in New York City, and we have not had the interest shown by the pharmacists of that city in this Association which should have been shown. I believe that one of the reasons has been that New Yorkers are so immersed in their own affairs that they expect all the world to come to them, and we want this Association to come to us in 1898.

MR. DOHME: I wish to remind you that I have the precedence in favor of Baltimore over the gentlemen from Omaha or New York, and have invited you for 1898. We have not met in Baltimore since 1870. We have not everything that New York has, but I am sure that the Association will enjoy its stay there more than in New York. We have a large number of pharmacists there, very few of whom are members of the Association, and we want to recruit.

Dr. Whelpley moved that the communication from Nebraska and the remarks of Mr. Mayo and Mr. Dohme be referred to the Committee on Time and Place of Meeting for the 1898 Convention.

The motion was seconded and carried.

The proposed amendments to the By-Laws, presented at former sessions, were brought up for action and read by the Secretary.

The following amendment, proposed by Dr. Whelpley, was, upon motion by Dr. Payne, adopted :

Substitute for Art. IV., Chap. IX., the following :

"Any person preparing a paper for the Association which will require more than ten minutes for its reading, must accompany the same with a synopsis which can be read within ten minutes' time. The paper and synopsis must both be furnished the committee of the particular Section to which it refers, previous to the first session."

The amendment to Art. IV., Chap. VIII., offered by Mr. Sheppard, to substitute in the third line the words, "the minutes of Council," for the words, "its minutes," was adopted on motion of Mr. Ryan.

Mr. Hallberg's proposition to amend Art. VII., Chap. IX., by adding the following was, on motion of Dr. Whelpley, duly seconded and adopted :

"It shall propose each year a subject for discussion at the meetings of the State Associations, and, at the following annual meeting of this Association, shall present a report of the action of the State Associations upon the subject proposed."

The following amendment to Art. II., Chap. VII., proposed by Mr.

Ebert, was, after a lengthy discussion, participated in by Messrs. Sheppard, Dohme, Ebert, Payne, Parisen and the Secretary, laid upon the table at the instance of the author :

Amend Art. II., Chap. VII., of the By-Laws as follows :

On second line insert after the word "membership" the words, "provided the application is duly signed and accompanied by the annual dues for the current year."

Strike out on eleventh line of same article after the word "By-Laws" the words, "and paying the annual dues for the current year."

MR. SHEPPARD: The Chairman of the Section on Commercial Interests, Mr. Hopp, of Cleveland, was obliged to leave us last night. Before leaving he had a long conversation with me; and as a result of that conversation he asked me to propose for him the following motion :

*Resolved*, That the Chairman of the Section on Commercial Interests be given authority to arrange for the meeting of that Section at the close of the last general session, if in his judgment such action is deemed desirable.

THE PRESIDENT: That means a change in the By-Laws.

MR. SHEPPARD: This is just for the next meeting.

THE PRESIDENT: Inasmuch as the By-Laws provide for the meeting of the Commercial Section, I do not think we can fix it now.

MR. SHEPPARD: We have already changed them.

THE PRESIDENT: I take it not to be within the province of this meeting to arrange the program for the next meeting, which is already fixed by the By-Laws.

MR. EBERT: Can we not ask the Council to arrange for the next meeting?

THE PRESIDENT: The Council arranges the program for the next meeting, but the order of the Sections is fixed by the By-Laws, and the Council even has not the authority to reverse that order. That would be my decision.

MR. SHEPPARD: We have no right, and never have attempted, to change the order permanently; but we have very frequently, by special vote, changed the order for the time being.

THE PRESIDENT: My ruling is that the motion is not in order.

DR. WHELPLEY: Can we not make this in the form of a suspension of the By-Laws?

THE PRESIDENT: I will state that it is a dangerous precedent for any meeting on the eve of adjournment to take the responsibility of the next meeting.

Mr. Sheppard gave notice that he will move an amendment to the By-Laws with regard to the Commercial Section, at the first session of the meeting of 1897.

The Secretary having brought up the matter of stationery for the Association and the Sections, it was, after some discussion, moved by Mr. Dohme and seconded that the Secretary print general letter heads and receive from the various chairmen of the committees the data necessary for the extra printing matter for each Section and the number of letter heads that may be required by each Section for the year.

The motion was carried.

Dr. Whelpley moved that the badges and bars of the Association be placed in the hands of the Local Secretary for sale at the next meeting.

Seconded and carried.

On motion of Mr. Sheppard it was agreed that the Local Secretary for next year be made Chairman of the Committee of Arrangements, with authority to appoint other members of the committee.

Dr. Whelpley moved the following vote of thanks, which was carried unanimously.

*Resolved*, That the visiting members of the American Pharmaceutical Association extend a vote of hearty thanks to the Local Committee, other pharmacists and their friends of Montreal and the Provinces, including the daily press, who have so thoughtfully cared for our comfort and otherwise contributed to the success of the forty-fourth annual meeting of this organization. Be it

*Resolved*, That we recognize the kind hospitality of our Canadian friends and the great interest manifested in the welfare of the American Pharmaceutical Association in particular, and the pharmaceutical profession in general. Be it further

*Resolved*, That we pass a special vote of recognition to the local Secretary, Mr. J. E. Morrison, to whom we are indebted for the energy necessary to obtain the 1896 meeting on Canadian soil.

MR. CHAPMAN: Mr. President and members of the Association, partly on my own behalf and on behalf of my confreres I accept your vote of thanks. I feel personally that the indebtedness is on our side. I have met gentlemen here that I shall always esteem it an honor to know, and I shall try to be present at as many of your conventions as possible, because I consider it a great help and source of instruction in our profession.

MR. MORRISON: I beg to thank you for this mark of your appreciation of my efforts to make the present meeting a success; and I can assure you that this work which I have done during the past three years, since the Chicago meeting, has been amply repaid by the success which we have had; it has been amply repaid by the fact that you have seemed to be very well satisfied with your reception and entertainment. Of course there are some things we could not control. "The best laid plans of men and mice oft gang alee." But on the whole we have every reason to be satisfied. Financially we have made a success of it also; for I think we will be able to hand over a balance of between \$150 and \$200 to the Association when we get our accounts cleared up.

THE PRESIDENT: We will now proceed to the installation of officers, and I appoint Messrs. Chapman and Hereth to escort the newly-elected officers to the Chair.

MR. CHAPMAN: We have the honor to present to you Mr. J. E. Morrison, of Montreal, the newly-elected President.

PRESIDENT GOOD: Members, you have before you the newly-elected president. Mr. Morrison has been very much in evidence at our meetings for the past few years, working in the interest of the American Pharmaceutical Association first, and incidentally, of course, in the interests of Montreal and Canada. These interests, however, are mutual; but he has shown himself so very efficient in our interests that he has been rewarded by his elevation to this office, and needless to say, he is eminently fitted for the position. The insignia of office is safe in his hands, and the instalment is now complete by the affixing of the badge.

MR. MORRISON: Mr. President and Fellow Members of the American Pharmaceutical Association, I can assure you that I heartily thank you for the great honor which you have conferred upon me in electing me as President. I can remember when I was first initiated into the mysteries of pharmacy, that I looked upon membership in the American Pharmaceutical Association as one of those honors to which I might attain. In the course of time, after passing my examinations as a pharmacist, I joined your Association; but I can assure you from the bottom of my heart that in the wildest flights of my imagination it never entered my mind that I should one day be called upon to fill a chair which had already been filled by such men as Parrish, Ebert, Lloyd, Remington, Patch and yourself, Sir. That was beyond me, I thought. However, you have seen fit to honor my slight abilities and humble services by putting me here to fill this chair. But, Mr. President, I feel also that it is not a compliment to myself personally; I think it is more of a compliment to the pharmacists of Canada, and especially to the pharmacists of the Province of Quebec; and I can assure you that every loyal member of the Pharmaceutical Association of the Province of Quebec and of the Montreal College of Pharmacy feels flattered and pleased and proud that one of their members has been honored by the presidency of the American Pharmaceutical Association. They feel that I have been the humble instrument to reflect the glory of this position on our Association here and upon pharmacy in Canada. I know also that my elevation to this position will act as a stimulus to our young men, to our young pharmacists, to strive to perfect themselves in their profession and to make themselves possible occupants of the presidential chair of the American Pharmaceutical Association. Again I beg to thank you for the honor which you have conferred upon me.

THE PRESIDENT: Ladies and Gentlemen, I introduce to you Dr. George F. Payne, of Atlanta, Georgia, who has showed his very deep interest in the American Pharmaceutical Association for many years, as you know, and has been one of the hardest worked men in the Association during the past year.

DR. PAYNE: Fellow members of the Association, I had in my mind to attempt to make a little speech, but I am nothing of a speaker. Like most pharmacists, my time has been taken up more in actual work than words. If I were as bright, and sparkling, and witty as one of our members, I might give you something that would equal the *ŕite de nuit* of the other evening, or if I had that flow of language, which is as mighty as the St. Lawrence, of another member of the Association, I might say a great deal that could interest you; but I will simply close with this remark, that I sincerely trust that it will never be my position to be called upon to take the place of our worthy President; for as 1st Vice-president I can only act when he will have left the scene, a thing which I hope will not occur during our membership, and I hope that I will live so long that I will see many of the gray heads around me still grayer. Although myself a pharmacist of thirty-five years of actual practical experience in pharmacy, I feel but an embryo in the presence of so many gray-haired members of the profession, members upon whose heads have been heaped so many honors, honors innumerable, men that I seem to have known all my life and men that I have always honored. My membership, although short, is one of the most pleasant recollections of my whole existence, and each year as the meetings roll round, I feel that if I miss one, I have missed the opportunity of my life. Gentlemen, I will not hold you any longer; but I wish to congratulate this Association upon the progress which is being made in scientific work, and also in the active co-operative efforts that are being made toward securing from the public the just recognition of the ability and tremendous responsibility of the modern pharmacist.

The 2nd Vice-President being absent, was not installed.

THE PRESIDENT: I introduce to you Mr. G. W. Parisen, the 3rd Vice-President.

MR. PARISEN: Mr. President and Members of the American Pharmaceutical Association: I accept this position of honor which you have bestowed upon me, and wish to express my thanks for it. As I said when I was nominated, I never dreamed of occupying the position of an officer of the American Pharmaceutical Association. I was glad to become an humble member, and thought my election as a member of this Association an honor not only to myself, but to the Association which I represent, that of the State of New Jersey. I hope to merit the new honor which you have conferred upon me, and I shall endeavor to do all I can towards the advancement of the Association. I again thank you, gentlemen.

The Treasurer was next escorted to the Chair.

THE PRESIDENT: On our ride yesterday a member called my attention to the peculiar position of our Treasurer. He has in close keeping and in conscientious care the interests of the Association. There he was, right in the bow of the boat, looking ahead for breakers.

MR. SHEPPARD: Mr. President, Fellow Members and Ladies: You all know that I am modest and I cannot make a speech. I tried to get out of this. It seems to me almost too bad that when you burden your permanent officers with so much work, they should be asked to take any part in the ornamental proceedings; but still I am here, thanks to our good President, who would not receive my motion. I would say, fellow members, that I do love this old Association. I love it better year by year. Our good friend Kennedy has occupied his present position for twenty-three years. That is exactly the number of meetings I have attended; and, as we come here for the second time on Canadian soil, it seems to me that we ought to specially emphasize the importance of this meeting. I do believe most heartily in bringing the various parts of our country together; and when I say "our country" I mean the whole of North America, and more especially the English-speaking people. This is one of the results which has been very manifestly obtained by this Association in the United States. We meet first in the North, then in the South, then in the West, and then in the middle portions. The result of it has been good-fellowship among the druggists everywhere; and now that we have for the second time come to Canadian soil, let us say to one another that we will come here very often, that we will come here soon again. We have had a good time here; we have become acquainted with our Canadian brothers. We know them better, having seen them face to face and shaken their hands. Let us not wait till this generation shall have passed away to come here again, but let us come soon, and show them that we and they are one, and that what we heard at the close of the concert last night, "God Save the Queen" and "Our Country 'Tis of Thee," are the same. As pharmacists our interests are the same, and there is no difference in the objects which we desire to attain. I hope it will not be many years before one Pharmacopœia will be the guide of this whole American continent. One word more, my friends, and I will say good-bye for this meeting. We want to use every effort possible during this next year to help out our financial interests. You know we have had during the last three years very hard times, and have had deficits of \$1,000, \$1,200 and \$1,500. That will not do. We must every one of us put our shoulders to the wheel, and see that our permanent funds shall not be encroached upon. Let us get in new members this year, and have them pay their \$5.00, so that when the Treasurer's report is brought before you next year we shall have a balance on the other side.

THE PRESIDENT: We have a new officer to install, the General Secretary. Our good

servant's previous title was Permanent Secretary, but he now becomes General Secretary. We will now, Mr. Secretary, give you an opportunity to explain any matters which may not have been to your entire satisfaction or to ours during the past year.

MR. CASPARI: Mr. President and Fellow Members: It is assuredly very gratifying to me to receive a vote of your confidence at this important change made in the Constitution. For nearly thirty years the position of Permanent Secretary was held by the late Professor Maisch to the entire satisfaction of the Association; and, after his demise, when you saw fit in your wisdom to call me to be his successor, I felt that a weight had been laid on my shoulders. At Asheville I promised to fulfill the duties of the office to the best of my ability, and I asked your indulgence for my shortcomings. Having been elected to the position of Permanent Secretary, there was naturally no occasion for re-election, but I find myself legislated out of office by a change in the Constitution. This change, I was in hope, would bring forward some little competition for the office, and yet I will be frank enough to say that I feel gratified that the position was given to the one who held the position of Permanent Secretary. I am gratified for this reason, that at this opportunity presented for a change I was shown by the Association that the manner of my work had not been wholly unsatisfactory to them during the past two years, and they were willing to give me another trial. I can assure you that I gratefully accept the position which you have given me, and that I will again endeavor to perform its duties to the best of my ability, and possibly to your satisfaction.

Prof. Diehl, Reporter on the Progress of Pharmacy, was escorted to the Chair.

THE PRESIDENT: I have to introduce to you Prof. C. Lewis Diehl, the newly-elected Reporter on the Progress of Pharmacy. Mr. Diehl, the American Pharmaceutical Association does not readily give up a good thing when it knows it has it.

MR. DIEHL: Mr. President, I thank you for the kind manner of my introduction. Fellow-members, I thank you for having again honored me by electing me to the office of Reporter on the Progress of Pharmacy. It is evident that you have been satisfied with the work that I have done in the past, and inasmuch as I have a very long speech to make for the coming year, I will simply close by saying that I hope I will give as much satisfaction in the future.

THE PRESIDENT: As members of the Council for the next three years there have been elected Mr. Charles Dohme of Baltimore, Mr. Remington of Philadelphia, and Mr. Good of St. Louis. I will delegate Mr. Dohme to speak for the three newly-elected members.

MR. DOHME: Mr. President, although I think you would have done better to have deputed a speaker of more ability than your humble servant, still, as you desire me to say a few words, I would say that I have now been consecutively in the Council for six or seven years, and either as one of your Vice Presidents or as one of the Council, have had occasion to learn much of the business of importance and of the many labors that are put upon the members of this body, I have also had occasion to spend very many pleasant hours with members of the Council, and I hope to continue to do so for many years, as many years as you may allow me. I am sure you have made no mistake in selecting this time our worthy Chairman, Mr. Good, who has so well presided over our meetings this year, and who, as a former member of our Council, has proved himself to be one of the most efficient members we have ever had.

THE PRESIDENT: Allow me to thank you for the very courteous treatment which I have had at your hands during this meeting. I now resign the gavel to my successor.



Mr. Morrison here took the Chair.

DR. STEWART: I would like to make a motion tendering the thanks of the Association to the retiring President, whose rulings have been exceedingly fair, and who has done justice to all the different sections represented here.

The motion was seconded by Mr. Hereth and carried.

Mr. Ebert moved a vote of thanks to all the other officers who have served during the last year, which motion was seconded and carried.

The President proceeded to name the members of the different committees:

DR. STEWART: I would like to give notice that we will have a meeting of the Committee on National Legislation immediately after the adjournment of this session.

Mr. Seabury moved that the Chair at its convenience appoint a delegation of five members to attend the meeting of the National Wholesale Druggists' Association, which opens on the fifth of October next at Philadelphia.

Motion seconded and carried.

On motion of Mr. Alpers, the reading of the minutes was dispensed with.

MR. MAYO: Allow me to make one motion which I had overlooked. I move that a committee of five be appointed to investigate and report at the next meeting of the Association upon the feasibility and advisability of having a meeting of the Association on board a steamer en route for England, in 1900, with a view to having the members, if possible, attend the Paris exhibition.

The motion was seconded by Dr. Whelpley, and carried.

Mr. Ryan moved that the meeting now adjourn and that it stand adjourned till 9 A. M. on Wednesday, the 26th inst., at the close of the social session which has been arranged for by the Council and approved by the Association.

Seconded and carried.

CHAS. CASPARI, JR., *General Secretary*.

#### TENTH SESSION—WEDNESDAY MORNING, AUGUST 26, 1896.

The Association was called to order in the hall of the Montreal College of Pharmacy, President Morrison being in the Chair.

In the absence of the General Secretary, the President appointed Mr. E. Muir secretary pro. tem.

After the reading of the minutes of the last session it was moved by Mr. Macmillan and seconded by Prof. Lecours that the Association do now adjourn to meet again at Lake Minnetonka, Minn., on Monday, August 23, 1897, at 3 o'clock P. M. Carried.

The meeting then adjourned.

E. MUIR, *Secretary Pro. Tem.*

**ALPHABETICAL LIST OF NAMES OF MEMBERS FROM WHOM  
MONEY HAS BEEN RECEIVED BY THE TREASURER  
FOR ANNUAL DUES OR CERTIFICATES, FROM  
JULY 1, 1895, TO JULY 1, 1896.**

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Adams, John D.....	'94-'95	\$10 00	Amount brought forward.....	\$350 00	\$5 00
Aimar, Charles P.....	'95	5 00	Borell, Henry A.....	'95-'96	10 00
Alexander, Maurice W.....	'95	5 00	Bowron, Walter H.....	'94-'95	10 00
Allison, William O.....	'95-'96	10 00	Boynton, Herschell.....	'95-'96	10 00
Amend, Otto P.....	'95	5 00	Brack, Charles E.....	'95-'96	10 00
Anderson, Charles B.....	'93-'94	10 00	Bradbury, Wymond H.....	'95	5 00
Anderson, James M.....	'95	5 00	Bradley, Augustus.....	'95	5 00
Anderson, Samuel.....	'95	5 00	Brand, Erich.....	'95	5 00
Andrew, Edgar C.....	'95	5 00	Brandenberger, Adolph.....	'95	5 00
Andrews, Josiah H.....	'95	5 00	Braun, Adolf.....	'95	5 00
Ardery, Lorimer.....	'95	5 00	Braunwarth, Alice L.....	'96	5 00
Argenti, Jerome J. B.....	'95	5 00	Brecht, Frederick A.....	'95	5 00
Arnold, Charles F.....	'95	5 00	Breunert, Herman O.....	'95	5 00
Arrington, Homer H.....	'95	5 00	Brewer, John W.....	'95	5 00
Asplin, John H.....	'94-'95	10 00	Brisley, Harry.....	'95-'96	10 00
Atwood, Herman W.....	'94	5 00	Bronson, George S.....	'94	5 00
Ault, Edward A.....	'95	5 00	Brooks, George W.....	'96	5 00
Averill, William H.....	'95	5 00	Brown, Albert E.....	'95	5 00
Axness, Ole M.....	'95	5 00	Brown, Robert J.....	'93	5 00
Bailey, Frederick.....	'95-'96	10 00	Brown, William A.....	'95-'96	10 00
Baird, Julian W.....	'96	5 00	Brown, William T.....	'95	5 00
Baker, Edwin.....	'96	5 00	Bruce, James.....	'94-'95-'96	15 00
Baker, T. Roberts.....	'96	5 00	Bruck, Philip H.....	'96	5 00
Ball, Charles E.....	'95	5 00	Bruguier, Francis.....	'95	5 00
Balscr, Gustavus.....	'96	5 00	Brundage, Albert H.....	'95-'96	10 00
Baridon, Louis R.....	'96	5 00	Brunner, Charles H.....	'95	5 00
Bartells, George C.....	'95	5 00	Brunner, Norman L.....	'95	5 00
Bartlet, William W.....	'93	5 00	Buck, John.....	'94	5 00
Bartley, Elias H.....	'96	5 00	Buck, John L.....	'94-'95-'96	15 00
Bassett, Charles H.....	'93	5 00	Burg, John E.....	'95	5 00
Bastin, Edson S.....	'95	5 00	Burge, James O.....	'94-'95	10 00
Baur, Jacob.....	'95-'96	10 00	Burgheim, Jacob.....	'95	5 00
Baylis, Lewis F.....	'96	5 00	Burnham, Alfred A., Jr.....	'96	5 00
Bayly, Charles A.....	'95	5 00	Butler, Charles H.....	'96	5 00
Beal, James H.....	'96	5 00	Butler, Freeman E.....	'95-'96	10 00
Beardmore, William A.....	'95	5 00	Button, Charles E.....	'96	5 00
Beasley, William A.....	'95	5 00	Byrne, John.....	'96	5 00
Behrens, Paul J.....	'95	5 00	Calder, Albert L.....	'96	5 00
Beitenman, William W.....	'96	5 00	Calvert, John.....	'95	5 00
Bendiner, Samuel J.....	'96	5 00	Cambier, Jacob.....	'95-'96	10 00
Benhard, Albert H.....	'95	5 00	Capdau, Pierre A.....	'95	5 00
Benton, Wilber M.....	'95	5 00	Capper, William E.....	'94-'95	10 00
Berryhill, Henry P.....	'96	5 00	Carr, Jerome C.....	'95	5 00
Best, John.....	'95	5 00	Carrell, Eugene A.....	'95	5 00
Betz, Otto E.....	'94-'95	10 00	Carlsake, George M.....	'95	5 00
Betzler, Jacob.....	'95	5 00	Carter, Frank H.....	'95	5 00
Beyschlag, Charles.....	'96	5 00	Carton, John A.....	'95	5 00
Binkley, George K.....	'95	5 00	Case, Charles H.....	'95	5 00
Bishop, Samuel E.....	'95	5 00	Caspari, Charles, Jr.....	'96	5 00
Blackman, Augustus S.....	'95	5 00	Casper, Thomas J.....	'96	5 00
Blakie, William.....	'96	5 00	Cates, William E.....	'95	5 00
Blakely, George C.....	'94-'95	10 00	Chabot, David P.....	'95	5 00
Blanding, William O.....	'96	5 00	Chalin, Louis F.....	'94-'95	10 00
Blank, Alois.....	'95	5 00	Chandler, Charles F.....	'96	5 00
Bley, Alphonso A. W.....	'96	5 00	Chapin, Fred. H.....	'95	5 00
Blumauer, Louis.....	'95	5 00	Chapin, William A.....	'96	5 00
Boeddiker, Otto.....	'95	5 00	Chapman, William H.....	'95	5 00
Boehm, Solomon.....	'95	5 00	Cheatham, Thomas A.....	'95	5 00
Boerner, Emil L.....	'94-'95	10 00	Christie, James.....	'95	5 00
Bond, John B.....	'94-'95	10 00	Church, Merton E.....	'95	5 00
Amount carried forward.....	\$350 00	\$5 00	Amount carried forward.....	\$725 00	\$10 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$725 00	\$10 00	Amount brought forward.....	\$1175 00	\$22 50
Clark, James R.....'95-'96	10 00	7 50	Duble, Jesse B.....'95	5 00	
Clark, John A.....'95	5 00		Duggan, James.....'96	5 00	
Clowes, William L.....'95	5 00		Dunn, John A.....'96	5 00	
Coblentz, Virgil.....'95	5 00		Dunwoody, Richard G.....'95	5 00	
Colburn, Jesse M.....'95	5 00		Dutcher, Alfred L.....'95	5 00	
Cole, Allen M.....'95	5 00		Eads, Robert I.....'95	5 00	
Colgan, John.....'95	5 00		Eagney, James T.....'96	5 00	
Collins, Albert B.....'96	5 00		Earl, Noble C.....'95	5 00	
Collins, Carrie S.....'95-'96	10 00		Eccles, Robert G.....'96	5 00	
Comings, Charles S.....'93	5 00		Eckstein, Andrew J.....'95-'96	10 00	7 50
Cone, Alfred G.....'93	5 00		Edwards, Frederick B.....'95	5 00	
Conrad, John.....'94	5 00		Eger, George.....'94-'95	10 00	
Conrath, Adam.....'96	5 00		Eichrodt, Charles W.....'95	5 00	
Cook, Gilbert S.....'95-'96	10 00		Eimer, Charles.....'95	5 00	
Cook, Thomas P.....'96	5 00		Eliel, Leo.....'95	5 00	
Coon, James V. D.....'95	5 00		Elliott, Henry A.....'96	5 00	
Cornell, Edward A.....'95	5 00		Emerson, Hermann L.....'95	5 00	
Corcoran, Charles E.....'95	5 00		Emich, Columbus V.....'96	5 00	
Cotton, William H.....'95	5 00		Entz, Jacob J.....'95	5 00	
Coupe, Robert E.....'95	5 00		Eppley, James K.....'95	5 00	
Craighead, Gordon G.....'95	5 00		Ernst, Frank F.....'95	5 00	
Cramer, Max.....'96	5 00		Estabrook, Henry A.....'95	5 00	
Crona, Sixtus E. S.....'93-'94-'95	15 00		Estes, Joseph J.....'96	5 00	
Cronheim, Solomon.....'95	5 00		Evans, Joseph S.....'96	5 00	
Croom, James D.....'95	5 00		Ewing, Frederic C.....'95-'96	10 00	
Crowdie, John E.....'95	5 00		Ewing, John.....'95-'96	10 00	
Crum, John D.....'93	5 00		Eyssell, George.....'95	5 00	
Culbreth, David M. R.....'96	5 00		Faber, Frederick W.....'95	5 00	
Currier, Edward H.....'95	5 00		Fairchild, Benjamin T.....'95	5 00	
Curry, David W.....'95	5 00		Farrar, Samuel R.....'95	5 00	
Curtman, Charles O.....'95-'96	10 00		Feemster, Joseph H.....'93-'94-'95	15 00	
Cuthbert, Richard W.....'96	5 00		Fennel, Charles T. P.....'96	5 00	
Cuts, Foxwell C., Jr.....'96	5 00		Fenner, Alexander W.....'95	5 00	
Danek, John F.....'95	5 00	5 00	Fieber, Gustavus A.....'95	5 00	
Danforth, Edmund C.....'95	5 00		Field, Claud.....'95	5 00	
Danz, Martin.....'95	5 00		Fink, Frederick W.....'96	5 00	
Darrah, Andrew J.....'95	5 00		Finlay, Alexander K.....'95	5 00	
Daus, Leopold L.....'95	5 00		Finley, Arthur C.....'94-'95-'96	15 00	
D'Avignon, J. Eugene.....'95	5 00		Firmin, John C.....'95	5 00	
Davis, Eugene M.....'94-'95	10 00		Fischer, E. Baldwin.....'95	5 00	
Davis, John A.....'95	5 00		Fischer, Oscar F.....'95	5 00	
Davis, William M.....'93-'94-'95	15 00		Fisher, Elbert E.....'96	5 00	
Davison, James.....'95-'96	10 00		Fisher, George W.....'96	5 00	
Dawson, John H.....'95	5 00		Flanagan, Lewis C.....'96	5 00	
Day, William B.....'95	5 00		Flemer, Lewis.....'95	5 00	
Decary, Louis A.....'95	5 00		Flett, Frederick W.....'93	5 00	
DeGraffe, Bertha L.....'95	5 00		Fletcher, John W.....'96	5 00	
DeLang, Alfred.....'94-'95-'96	15 00		Fortier, Lawrence H.....'94-'95	10 00	
Delouest, Edward.....'95	5 00		Foster, J. Webb.....'95	5 00	
Demond, Otto J.....'95	5 00		Foulke, James.....'95-'96	10 00	
Dent, Warren F.....'95	5 00		Fowler, Joseph W.....'95	5 00	
Depeyre, Louis N.....'95	5 00		Fox, Peter P.....'95	5 00	
Devine, John.....'95	5 00		Frames, J. Fuller.....'95	5 00	
Dewoody, William L.....'95	5 00		Fraser, Horatio N.....'96	5 00	
Diebert, Thomas I.....'95	5 00		Fraser, Herman E.....'95	5 00	
Diehl, C. Lewis.....'95	5 00		Freeman, William B.....'95	5 00	
Dilly, Oscar C.....'95	5 00		French, Harry B.....'95-'96	10 00	
Dimmitt, Addison L.....'95	5 00		French, John I.....'95	5 00	
Dimock, Robert H.....'96	5 00		Frohwein, Richard.....'95-'96	10 00	
Dixon, Frederick H.....'95	5 00		Frost, William A.....'94-'95	10 00	
Dobbins, Edward T.....'95-'96	10 00		Frye, George C.....'96	5 00	
Doerschuk, Albert N.....'95	5 00		Gallagher, John C.....'95	5 00	
Dohme, Alfred R. L.....'95	5 00		Galt, Edward P.....'94	5 00	
Dohme, Charles E.....'95	5 00		Gammon, Irving P.....'95	5 00	
Dohme, Louis.....'95	5 00		Gane, Eustace H.....'95	5 00	
Dolan, Frank L.....'95	5 00		Gano, William H.....'95-'96	10 00	
Donaldson, Joseph C.....'94-'95	10 00		Gardner, Robert W.....'95	5 00	
Dorr, Edward C.....'95	5 00		Gaus, Charles H.....'95-'96	10 00	
Dougherty, Samuel E.....'95	5 00		Gausewitz, William.....'95	5 00	
Douglass, Henry, Jr.....'95	5 00		Gayle, John W.....'96	5 00	
Downing, Lucien B.....'96	5 00		Gayner, John N.....'94-'95	10 00	
Drake, Frederick T.....'95	5 00		Geiger, Charles F.....'95	5 00	
Drake, John R.....'96	5 00		Geissler, Joseph F.....'95	5 00	
Dresser, George E.....'95	5 00		George, Charles T.....'95-'96	10 00	
Druehl, Frank A.....'95	5 00		Gering, Henry R.....'95	5 00	
Amount carried forward.....	\$1175 00	\$22 50	Amount carried forward.....	\$1630 00	\$30 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$1630 00	\$30 00	Amount brought forward.....	\$2000 00	\$30 00
Gerhard, Samuel.....93-94	10 00		Hess, Paul L.....95	5 00	
Gessner, Emil A.....96	5 00		Hettinger, Howard H.....95	5 00	
Gibson, Charles.....94-95-96	15 00		Heyerdahl, Carl Otto.....95	5 00	
Gilbert, Charles A.....96	5 00		Hickerson, William H.....96	5 00	
Gill, George.....96	5 00		Higgins, Albert W.....95	5 00	7 50
Gleim, John C.....96	5 00		Hill, Frederick J.....95	5 00	
Glines, George W.....95	5 00		Hillebert, George A.....95	5 00	
Glover, William H.....95	5 00		Hinrichs, Gustavus D.....95	5 00	
Good, James M.....95	5 00		Hitchcock, John E.....95	5 00	
Goodale, Harvey G.....95	5 00		Hodgkins, Bert W.....94-95	10 00	
Gooding, Charles J.....95	5 00		Hodgkinson, Sam'l J.....95-96	10 00	
Goodrich, George H.....95	5 00		Hogan, John J.....95-96	10 00	
Goodwin, Lester H.....95	5 00		Hogey, Julius H.....94	5 00	
Gorman, John T. B.....95	5 00		Holgate, Francis H.....95	5 00	
Gosman, Adam J.....96	5 00		Holland, George.....95	5 00	
Grandjean, Eugene.....95	5 00		Holland, Samuel S.....95	5 00	
Grassly, Charles W.....95	5 00		Hollister, Albert H.....95	5 00	
Gray, Henry R.....95	5 00		Holmes, Clay W.....96	5 00	
Gray, William.....95	5 00		Holverson, Henry T.....95	5 00	
Green, Benjamin.....96	5 00		Hood, Charles I.....95-96	10 00	
Greene, William R.....95-96	10 00		Hopp, Lewis C.....95	5 00	
Gregory, Willis G.....94-95	10 00		Howar, William A.....95	5 00	
Greiner, William E.....96	5 00		Howard, Fletcher.....95-96	10 00	
Greve, Charles M.....95	5 00		Howson, Arthur B.....95	5 00	
Greyer, Julius.....95	5 00		Huder, Henry J.....95-96	10 00	
Griffen, Truman.....95	5 00		Hudson, Arthur.....95	5 00	
Gross, Edward Z.....95	5 00		Hudson, T. F.....95	5 00	
Grossman, Edward L.....94-95	10 00		Huecker, John.....94-95	10 00	
Gundrum, George.....95-96	10 00		Huested, Alfred B.....95-96	10 00	
Habliston, Charles C.....95	5 00		Humiston, Edwin R.....95	5 00	
Haggarty, Mary.....95	5 00		Huntington, William H.....96	5 00	
Hall, Alden T.....95	5 00		Hurlebaus, George W.....95	5 00	
Hall, Edwin B.....96	5 00		Hurty, John N.....95-96	10 00	
Hall, Nettie C.....95	5 00		Huston, Charles.....96	5 00	
Hall, William A.....95	5 00		Hynson, Henry P.....95	5 00	
Hamilton, Claude C.....95	5 00		Ingalis, John.....95	5 00	
Hamlin, James A.....95	5 00		Ink, Charles E.....95	5 00	
Hance, Edward H.....95-96	10 00		Jacobs, Joseph.....96	5 00	
Hancock, Charles W.....95	5 00		Jelliffe, Smith E.....95-96	10 00	
Hancock, J. Henry.....95	5 00		Jenkins, Luther L.....95	5 00	
Hannan, Owen B.....94-95	10 00		Jennings, N. Hynson.....95	5 00	
Harding, Lawrence A.....95	5 00		Jewell, Walter H.....95	5 00	
Hardy, Cyrus D.....95	5 00		Johnson, Daniel D.....95	5 00	
Harlow, Noah S.....96	5 00		Johnston, Henry A.....95	5 00	
Harrah, John W.....95	5 00		Jones, Alexander H.....95-96	10 00	
Harrington, Frank.....95	5 00		Jones, David F.....95	5 00	
Harris, Francis M.....95	5 00		Jones, Edward B.....95	5 00	
Harrison, Jacob H.....95	5 00		Jones, Simon N.....95	5 00	
Harrison, Richard H. M.....95	5 00		Joyce, Robert.....95	5 00	
Harter, Isaac F.....96	5 00		Jungkind, John A.....94-95	10 00	
Hartwig, Charles F.....95	5 00		Kaczoroski, Adolph O.....95	5 00	
Harvey, John M.....95	5 00		Kaiser, William O.....94-95	10 00	
Hassebrock, Henry F.....95	5 00		Kalish, Julius.....96	5 00	
Hassinger, Samuel E. R.....95-96	10 00		Karb, George J.....96	5 00	
Hattenhauer, Robert C.....95-96	10 00		Kaufman, George B.....96	5 00	
Hatton, Edgar M.....95-96	10 00		Kebler, Lyman F.....95-96	10 00	
Hatton, Ellmore W.....96	5 00		Keenan, Thomas J.....95	5 00	
Hauenstein, William.....95	5 00		Keeney, Caleb R.....95-96	10 00	
Hausamen, Henry L.....95-96	10 00		Kellam, Chas. R. J.....95	5 00	
Hausemann, Frederick W.....95-96	10 00		Kemp, Edward.....96	5 00	
Hawkins, M. Smith.....96	5 00		Kennedy, Ezra J.....95	5 00	
Hawley, William B.....95-96	10 00		Kennedy, George W.....95	5 00	
Hay, Edward A.....96	5 00		Kent, Henry A., Jr.....95	5 00	
Hayes, Horace P.....96	5 00		Kenworthy, John.....95	5 00	
Haynes, David O.....96	5 00		Kerr, William W.....95	5 00	
Hays, Joseph A.....95	5 00		Kershaw, John P.....95	5 00	
Heinitsh, Sigmund W.....95-96	10 00		Kiedaisch, John F., Jr.....96	5 00	
Helke, William L.....96	5 00		Kieffer, George.....95-96	10 00	
Heller, Charles T.....95	5 00		Kienth, Hans.....93-94	15 00	
Hemm, Francis.....95	5 00		Kilmer, Frederick B.....95	5 00	
Henry, Charles.....95	5 00		Kirchgasser, William C.....96	5 00	
Henry, Charles L.....95	5 00		Kirchhofer, Paul.....95	5 00	
Hepburn, John.....95	5 00		Kirkland, Derwentwater.....95-96	10 00	
Herbet, William P.....95	5 00		Klein, Ernest F.....95	5 00	
Hereth, Frank S.....95-96	10 00		Klein, Frederick.....95-96	10 00	
Amount carried forward.....	\$2000 00	\$30 00	Amount carried forward.....	\$2565 00	\$37 50

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$2565 00	\$37 50	Amount brought forward.....	\$2985 00	\$55 00
Klie, G. H. Charles.....	95 5 00		McIntyre, Byron F.....	93-94 10 00	
Kline, Charles G.....	95 5 00		McIntyre, Ewen.....	95 5 00	
Kline, Mahlon N.....	95-96 10 00		McIntyre, William.....	96 5 00	
Klotz, August E.....	95 5 00	7 50	McKesson, G. Clinton.....	95-96 10 00	
Knabe, Gustavus A.....	95 5 00		McMeel, James H.....	95 5 00	
Koch, Julius A.....	95 5 00		Mehl, Henry W.....	95 5 00	
Koch, Louis.....	95-96 10 00		Meissner, F. W., Jr.....	96 5 00	
Koehnken, Herman H.....	95 5 00		Meissner, Paul E.....	95 5 00	
Krebs, Karl J.....	94-95 10 00		Mennen, Gerhard.....	95 5 00	
Krewson, William E.....	95 5 00		Merrell, Charles G.....	95 5 00	
Krieger, Philip.....	96 5 00		Merrell, George.....	95 5 00	
Kurfurst, Henry F.....	95 5 00		Michaelis, Gustavus.....	95 5 00	
La Pierre, Elie H.....	96 5 00		Miller, Emerson R.....	95 5 00	
Lachance, Seraphin.....	95 5 00		Miller, Jason A.....	96 5 00	
Laird, John.....	95-96 10 00	5 00	Milligan, Decatur.....	95-96 10 00	
Lalmant, Eugene.....	95 5 00		Miner, Maurice A.....	95 5 00	
Lampa, Robert R.....	95 5 00		Miner, Mrs. Mary O.....	96 5 00	
Lancot, Henri.....	95 5 00		Miner, Orrin E.....	95 5 00	
Lawbaugh, Emanuel S.....	95 5 00		Mittelbach, William.....	96 5 00	
Lawton, Charles H.....	95 5 00		Mohr, Charles.....	94-95-96 15 00	
Lawton, Horace A.....	95 5 00		Moore, Charles G.....	95 5 00	
Layton, Thomas.....	95 5 00		Moore, Joachim B.....	95 5 00	
Leavitt, Miner L. H.....	94 5 00		Moore, John T.....	96 5 00	
Lee, Charles H.....	95 5 00		Moore, Silas H.....	95 5 00	
Legendre, Joseph A.....	95 5 00		Morison, J. Louis D.....	95 5 00	
Lehmann, Louis.....	95 5 00		Mork, Thomas K.....	95 5 00	
Lehn, Louis.....	95 5 00		Morgan, Aylmer L.....	96 5 00	
Lehr, Philip.....	95 5 00		Morgan, Eugene H.....	95 5 00	
Leine, Arthur M.....	95 5 00		Morris, Lemuel I.....	94-95 10 00	
Leist, Jacob L.....	95 5 00		Morrison, Joseph E.....	94 5 00	
Leonhard, Rudolph E.....	95 5 00		Morton, John W.....	95 5 00	
Levinson, Joseph.....	95 5 00		Mowry, Albert D.....	95 5 00	
Levy, Adolph.....	95 5 00		Mueller, Adolph.....	96 5 00	
Levy, William M.....	95 5 00		Mueller, Otto E.....	95 5 00	
Lewis, Ernest G.....	95 5 00		Muir, Ebenezer.....	95 5 00	
Lilly, Eli.....	95 5 00		Mulcahy, Daniel D.....	95 5 00	
Lilly, Josiah K.....	95 5 00		Murray, Emmett L.....	95 5 00	
Lisle, Justin D.....	96 5 00		Myers, Daniel.....	96 5 00	
Livingston, Barent V. B.....	95 5 00		Naly, Sarah L.....	95 5 00	
Lockert, Charles L.....	95 5 00		Netz, Richard H. G.....	95 5 00	
Loomis, John C.....	95 5 00		Newman, George A.....	95 5 00	
Lord, Frank J.....	95 5 00		Newton, Philo W.....	95 5 00	
Lord, Thomas.....	96 5 00		Nichols, John C.....	95 5 00	
Lovia, Henry C.....	94 5 00		Nickey, Frank B.....	95-96 10 00	
Lowd, John C.....	96 5 00		Nippen, John A.....	96 5 00	
Lowden, John.....	94-95 10 00		Nisbet, William W.....	95 5 00	
Lowe, Clement B.....	95-96 10 00		Nordmann, Herman.....	95 5 00	
Lueder, Fritz.....	95 5 00		Norton, George E.....	95 5 00	
Lyons, Fred W.....	94-95 10 00		Ogier, John M.....	95-96 10 00	
MacDonald, Allan D.....	95 5 00		O'Hare, James.....	96 5 00	
MacRae, John V.....	95 5 00		O'Neil, Henry M.....	95 5 00	
Maine, August.....	96 5 00		Oberdeener, Samuel.....	95 5 00	
Majer, Oscar.....	95 5 00		Ohliger, Lewis P.....	95 5 00	
Mallinckrodt, Edward.....	95 5 00		Oliver, William M.....	96 5 00	
Markoe, George F. H.....	94 5 00		Orton, Ingomar F.....	96 5 00	
Marshall, Ernest C.....	96 5 00		Osgood, Hugh H.....	96 5 00	
Marshall, Rush P.....	95 5 00		Osmund, Charles A.....	95 5 00	
Martin, Nicholas H.....	95 5 00		Ottinger, James J.....	95-96 10 00	
Mason, Alfred H.....	95 5 00		Overstreet, William P.....	95 5 00	
Mason, George L.....	95 5 00	5 00	Owens, Richard J.....	96 5 00	
Mason, Harry R.....	96 5 00		Parisen, Allen C.....	95 5 00	7 50
Massey, William M.....	95-96 10 00		Parisen, George W.....	95 5 00	
Matthews, Charles E.....	96 5 00		Parker, William S.....	95 5 00	
Mattingly, George J.....	95 5 00		Parrott, John E.....	94 5 00	
May, Eugene.....	96 5 00		Partridge, Charles K.....	95 5 00	
May, James O.....	96 5 00		Partridge, Frank R.....	95 5 00	
McColgan, Adam T.....	95 5 00		Patch, Edgar L.....	96 5 00	
McComas, Percy G.....	95 5 00		Patterson, Theodore H.....	95 5 00	
McCrea, Harry F.....	95 5 00		Pattison, George H.....	95 5 00	
McDonald, George.....	94-95 10 00		Patton, John F.....	96 5 00	
McElhenie, Thomas D.....	95 5 00		Pauley, Frank C.....	95 5 00	
McElwee, Emer J.....	95 5 00		Payne, George F.....	96 5 00	
McFarland, Robert M.....	95 5 00		Peacock, Josiah C.....	94-95 10 00	
McGeorge, William.....	95 5 00		Pearce, Howard A.....	96 5 00	
McGill, John T.....	95 5 00		Pease, Autumn V.....	96 5 00	
Amount carried forward.....	\$2985 00	\$55 00	Amount carried forward.....	\$3410 00	\$62 30

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$3410 00	\$62 50	Amount brought forward.....	\$3875 00	\$70 00
Peck, George L.....	96 5 00		Ruddimann, Edsel A.....	95 5 00	
Pennington, T. H. Sands.....	94 5 00		Rudolf, Eliza.....	95 5 00	
Perkins, Benjamin A.....	96 5 00		Ruenzel, Henry G.....	96 5 00	
Perkins, C. William.....	95 5 00		Ruete, Theodore W.....	94-95 15 00	
Perkins, William A.....	95 5 00		Runyon, Edward W.....	95-96 10 00	
Perry, Frederick W. R.....	94 5 00		Ryan, Frank G.....	95 5 00	
Peter, Minor C.....	95 5 00		Sadtler, Samuel P.....	95 5 00	
Peterson, J. Otto.....	95 5 00		Sargent, Ezekiel H.....	94 5 00	
Peyton, Robert D.....	95 5 00		Sauer, Louis W.....	94-95 10 00	
Pfafflin, Henry A.....	95 5 00		Sauerhering, Rudolph A.....	96 5 00	
Pfunder, William.....	95 5 00		Saunders, William.....	95 5 00	
Phelps, Dwight.....	95 5 00		Sayre, Edward A.....	95 5 00	
Phillips, Charles W.....	95 5 00		Sayre, Lucius E.....	96 5 00	
Pickett, John H.....	95 5 00		Sayre, William H.....	95 5 00	
Pieck, Edward L.....	95 5 00		Schafer, George H.....	96 5 00	
Pierce, William H.....	96 5 00		Scheffer, Emil.....	95 5 00	
Pile, Gustavus.....	95-96 10 00		Schellentrager, Ernst A.....	95-96 10 00	
Pinniger, William.....	95 5 00		Scherff, John P.....	96 5 00	
Pitt, John R.....	96 5 00		Scherling, Gustav.....	95 5 00	
Plaut, Albert.....	96 5 00		Schieffelin, William J.....	96 5 00	
Pleasants, Chas. H.....	96 5 00		Schiemann, Edward B.....	95 5 00	
Plenge, Henry.....	95 5 00		Schimpf, Henry W.....	96 5 00	
Plummer, Edward.....	95 5 00		Schlaepfer, Henry J.....	96 5 00	
Porter, Chilton S.....	94-95 10 00		Schley, Steiner.....	95 5 00	
Porter, Millett N.....	95 5 00		Schmid, Henry.....	95 5 00	
Porterfield, William C.....	95 5 00		Schmidt, Ferdinand T.....	95 5 00	
Potter, Wm. R.....	96 5 00		Schmidt, Frederick M.....	96 5 00	
Potts, David G.....	95-96 10 00		Schmidt, Valentine.....	95 5 00	
Powell, Wm. C.....	95-96 10 00	7 50	Schmitt, George J. F.....	96 5 00	
Pressler, H. W.....	94-95 10 00		Schmitter, Jonathan.....	93-94-95 15 00	
Preston, Andrew P.....	95 5 00		Schoenhut, Christie H.....	96 5 00	
Preston, David.....	95-96 10 00		Schoettlin, Albert J.....	95 5 00	
Procter, Wallace.....	94-95-96 15 00		Scholtz, Edmund L.....	94-95 10 00	
Puckner, William A.....	95 5 00		Schrank, C. Henry.....	96 5 00	
Pursell, Howard.....	95 5 00		Schrouder, Benjamin.....	95 5 00	
Quackinbush, Benjamin F.....	96 5 00		Schueller, Ernst.....	96 5 00	
Quandt, Arthur A.....	95 5 00		Schueller, Frederick W.....	96 5 00	
Quandt, Ernest E.....	95 5 00		Schuh, Paul G.....	96 5 00	
Qvale, Victor A.....	95 5 00		Schurk, Louis.....	95 5 00	
Rademaker, Herman H.....	95 5 00		Scott, J. McDonald.....	95 5 00	
Rains, A. Brown.....	95 5 00		Scott, William H.....	96 5 00	
Ramsperger, Gustavus.....	96 5 00		Scoville, Charles H.....	94 5 00	
Randall, Frank O.....	95 5 00		Scoville, Wilbur L.....	96 5 00	
Rapelye, Charles A.....	95 5 00		Searby, William M.....	95 5 00	
Rauschkold, John.....	96 5 00		Selzer, Eugene R.....	95 5 00	
Ray, Frederick E.....	94 5 00		Sempill, Walter M.....	95-96 10 00	
Ray, Peter W.....	96 5 00		Sennewald, Ferdinand W.....	95 5 00	
Raymond, Harry L.....	93 5 00		Sevin, N. Douglass.....	95 5 00	
Reed, Willoughby H.....	95 5 00		Shafer, Erwin C.....	95-96 10 00	
Renz, Frederick J.....	95 5 00		Shake, Homer C.....	95 5 00	
Reynolds, John J.....	95 5 00		Shannon, Thomas R.....	95 5 00	
Rhode, Rudolph E.....	95 5 00		Shark, Harry.....	95 5 00	
Rhodes, Charles O.....	95-96 10 00		Shaw, Robert J.....	95 5 00	
Rice, Charles.....	96 5 00		Sherman, Charles R.....	95 5 00	
Richardson, Horatio S.....	96 5 00		Sherard, Charles C.....	95 5 00	
Richardson, Thomas L.....	95 5 00		Sherwin, Eugene A.....	96 5 00	
Richter, Gustave A.....	95 5 00		Sherwood, Louis W.....	96 5 00	
Riddell, Benjamin F.....	96 5 00		Shinn, James T.....	95-96 10 00	
Ridgway, Lemuel A.....	94-95-96 15 00		Schoemaker, Richard M.....	95-96 10 00	
Riley, Charles W.....	95-96 10 00		Shriver, Henry.....	95-96 10 00	
Robbins, Alonzo.....	95-96 10 00		Shryer, Thomas W.....	96 5 00	
Robertson, Felix O.....	96 5 00		Siegmund, Chas. A.....	95-96 10 00	
Robins, Wilbur F.....	95 5 00		Sieker, Ferdinand A.....	95 5 00	
Robinson, Edward A.....	95-96 10 00		Simms, Giles G. C.....	95 5 00	
Robinson, Ernest F.....	95 5 00		Simon, William.....	96 5 00	
Robinson, William A.....	94-95 10 00		Simpson, William.....	95 5 00	
Rogers, Arthur H.....	95 5 00		Simpson, William C.....	95 5 00	
Rogers, Henry H.....	95 5 00		Simon, Francis C.....	95-96 10 00	
Rogers, William H.....	95 5 00		Simon, William A.....	95-96 10 00	
Rhode, Claus F.....	95 5 00		Sippy, Alvin H.....	95 5 00	
Rosenthal, David A.....	95 5 00		Skinner, William H.....	95 5 00	
Rosewater, Nathan.....	93-94-95 15 00		Slater, Frank H.....	95-96 10 00	
Roux, Nemours P.....	95 5 00		Sleuman, Charles A.....	94-95-96 15 00	
Rowlinski, Robert A.....	95-96 10 00		Sloan, George W.....	95 5 00	
Royter, Oliver M.....	95 5 00		Smink, Robert W.....	95 5 00	
Amount carried forward.....	\$3875 00	\$70 00	Amount carried forward.....	\$4345 00	\$70 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$4345 00	\$70 00	Amount brought forward.....	\$4800 00	\$85 00
Smith, Charles B.....	95 5 00		Van Auker, Jerrie A.....	94-95 10 00	
Smith, Clarence P.....	95 5 00		Van Winkle, Abraham W.....	95 5 00	
Smith, Edward N.....	96 5 00		Vance, James W.....	95 5 00	
Smith, Edward S.....	95 5 00		Varney, Edward F.....	95 5 00	
Smith, Frank T.....	95 5 00		Vellines, Davies.....	95 5 00	
Smith, Lauriston S.....	96 5 00		Viallon, Paul L.....	93 5 00	
Smith, Linton.....	96 5 00		Vitt, Rudolph S.....	95-96 10 00	
Smith, Linville H.....	95 5 00		Voigt, Joseph F.....	95-96 10 00	
Smith, Reuben R.....	95 5 00		Vonachen, Frank H.....	95 5 00	
Smith, Whiteford G.....	95 5 00		Vordick, August H.....	95 5 00	
Smith, Willard A.....	95-96 10 00		Voss, George W.....	96 5 00	
Sniteman, Charles C.....	94-95 10 00		Votteler, William.....	95 5 00	
Snow, Charles W.....	96 5 00		Wagner, Henry.....	95 5 00	
Snyder, Alva L.....	95 5 00		Walbrach, Arthur.....	95 5 00	
Snyder, Robert J.....	95 5 00		Walker, William J.....	95 5 00	
Sohrbeck, G. Henry.....	95 5 00		Wall, Otto A.....	95 5 00	
Sorda, Thomas V.....	94-95 10 00		Wangler, Conrad D.....	95 5 00	
Spalding, Warren A.....	96 5 00		Ward, A. Jac.....	95 5 00	
Spencer, Peter I.....	95 5 00		Ward, Charles E.....	95 5 00	
Sperry, Herman J.....	96 5 00		Ward, George J.....	95 5 00	
Sprague, Wesson G.....	95-96 10 00	7 50	Ward, Milo W.....	95 5 00	
Squibb, Edward H.....	96 5 00		Warn, William E.....	96 5 00	
Squibb, Edward R.....	96 5 00		Warren, Edwin A.....	95 5 00	
Squires, G. Brenton.....	95 5 00		Warren, William M.....	95 5 00	
Staebler, Richard E. J.....	95 5 00		Washburn, Harry M.....	95 5 00	
Stahlhuth, Ernst H. W.....	94-95 10 00		Watson, Herbert K.....	95 5 00	
Stamford, William H.....	95 5 00		Watson, Sidney P.....	96 5 00	
Starz, Emil A.....	95 5 00		Waugh, George J.....	95 5 00	
Staudt, Louis C.....	95 5 00		Wearn, William H.....	93 5 00	
Stearns, Henry A.....	95 5 00		Webb, William H.....	95-96 10 00	
Stebbins, Harry F.....	93-94 10 00		Webster, H. Gordon.....	95 5 00	
Stecher, Henry W.....	95-96 10 00		Weidemann, Charles A.....	95-96 10 00	
Stedem, Frederick W. E.....	95-96 10 00		Weihe, Otto A.....	95 5 00	
Steele, George R.....	95 5 00		Weiser, William A.....	95 5 00	
Steinhauer, Frederick.....	95 5 00		Wells, Edwin H.....	95 5 00	
Steinmetz, Frank J.....	95 5 00		Wendell, Henry E.....	95-96 10 00	
Stevens, Alonzo B.....	95 5 00		Wenzell, William T.....	96 5 00	
Stewart, Francis E.....	95 5 00		Werner, Benjamin C.....	95-96 10 00	5 00
Stiles, Justin E.....	95 5 00		Werner, Rudolf C.....	95-96 10 00	
Stoehr, Julius J.....	95 5 00		Westmann, Frank H.....	95 5 00	
Stoughton, Dwight G.....	95 5 00		Westlake, Leonard J.....	95 5 00	
Stowell, Daniel.....	95 5 00		Wetterstroem, Albert.....	95 5 00	
Stuver, Emanuel.....	95 5 00		Weyer, John.....	95 5 00	
Sweet, Caldwell.....	95-96 10 00		Wheeler, C. Gilbert.....	93 5 00	
Symonds, Arthur H.....	95-96 10 00		Wheeler, Wm. D.....	95 5 00	
Tammen, George.....	95 5 00		Whelpley, Henry M.....	95 5 00	
Taylor, George E.....	95-96 10 00		Whitcomb, Frederick E.....	95 5 00	
Thames, Joseph J.....	95 5 00		White, Richard E.....	95 5 00	
Thatcher, Hervey D.....	95 5 00		Whiting, J. Fred.....	95 5 00	
Thomas, Oscar E.....	94 5 00		Whitman, Nelson S.....	95 5 00	
Thomas, Robert, Jr.....	95 5 00		Wienges, Conrad.....	95 5 00	
Thomasson, Anders.....	95-96 10 00		Wilcox, Frederick.....	96 5 00	
Thompson, Albert D.....	95 5 00	7 50	Williams, George G.....	95 5 00	
Thomsen, John J.....	96 5 00		Williams, John K.....	95 5 00	
Thorn, Henry P.....	96 5 00		Williams, Richard W.....	96 5 00	
Tigner, James O.....	95-96 10 00		Williams, Seward W.....	95 5 00	
Tilden, Amos K.....	95 5 00		Williams, William H.....	95 5 00	
Tobin, John M.....	94-95 10 00		Wills, Fred. M.....	95 5 00	
Todd, Albert M.....	96 5 00		Wilson, Benjamin O.....	95 5 00	
Tomlinson, Burton A.....	95 5 00		Wilson, Charles F.....	93 5 00	
Topley, James.....	96 5 00		Wilson, Frank M.....	94-95 10 00	
Torbert, Willard H.....	96 5 00		Wilson, William.....	94-95 10 00	
Townsend, Albert D.....	95 5 00		Winnberg, John M.....	94-95 10 00	
Tracy, David W.....	95 5 00		Wood, Alonzo F., Jr.....	96 5 00	
Trautmann, Ludwig.....	95 5 00		Wood, Edward S.....	96 5 00	
Travis, Miles B.....	94 5 00		Wood, James P.....	96 5 00	
Treat, Joseph A.....	96 5 00		Wood, Mason B.....	93-94-95 15 00	
Trimble, Henry.....	95-96 10 00		Woodman, Walter I.....	96 5 00	
Trux, Charles.....	96 5 00		Woodruff, Roderick S. 94-95-96	15 00	
Tscheppe, Adolph.....	94-95 10 00		Woods, George D.....	95 5 00	
Tuma, Bruno.....	96 5 00		Woodward, Brinton W.....	95 5 00	
Turner, George H.....	95 5 00		Woodridge, Daniel T.....	96 5 00	
Turrell, Judson W.....	95 5 00		Woolley, Steven D.....	94-95 10 00	
Uhlich, Ferdinand G.....	95 5 00		Wulling, Frederick J.....	95-96 10 00	
Urban, Jacob P.....	95 5 00		Wunderlich, Edward.....	95-96 10 00	
Amount carried forward.....	\$4800 00	\$85 00	Amount carried forward.....	\$5265 00	\$90 00

## ALPHABETICAL LIST OF MEMBERS.

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	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$5265 00	\$90 00	Amount brought forward.....	\$5290 00	\$90 00
Wurm, Theodore H.....'95	5 00		Zimmermann, Albert.....'96	5 00	
Wychoff, Elmer E.....'95	5 00		Zimmermann, Bernard.....'95	5 00	
Ziegler, Philip M.....'95	5 00		Zoeller, Edward V.....'95-'96	10 00	
Zimmer, Harry E.....'04-'95	10 00		Zuenkel, J. Ferd.....'96	5 00	
Amount carried forward.....	\$5290 00	\$90 00	Total .....	\$5315 00	\$90 00



MINUTES  
OF THE  
SECTION ON COMMERCIAL INTERESTS.

FRIDAY, AUGUST 14, 1896.

The Commercial Section was called to order by the Chairman Geo. J. Seabury at 3.50 p. m. In the absence of the Secretary H. Clay Holmes, who was detained at home by illness, James O. Burge was appointed to act as temporary Secretary.

Chairman Seabury delivered the following address :

FELLOW MEMBERS: At the Denver meeting in 1895, our commercial complications were reviewed by this section exhaustively. The conditions then existing, although another year has passed into history, leave the questions then discussed unchanged and unsolved. To write three addresses in one year and have them all interesting is no holiday task, yet I have attempted in this address to introduce original methods of presenting the subjects that properly come before the Section.

I am convinced that we all have an intelligent conception of our present mercantile and professional trials and tribulations; there is nothing which impresses me more than to have those convictions sustained by intelligent men throughout the country. In order to induce our members to rally around our Section, I concluded to repeat the queries formulated by me last year, and add to them a few other questions that by evolution are forcing themselves to the front. The object I had in reproducing and amending them was the hope that some of our members would answer them seriatim. My judgment proved correct, and I had the pleasure of receiving about fifteen that were answered after the unique style of "Two Strikers" of San Francisco, whose answers to my queries were not only a clever piece of literature and concentrated wisdom, but were one of the most enjoyable contributions to the questions which were propounded to this Section.

Out of these fifteen responses I selected five, three of which were signed by well-known pharmacists—one of whom is an ex-president of the Pennsylvania Pharmaceutical Association, and the other is a well-known writer on pharmacy and allied topics; these gentlemen are as well known as Prof. Hallberg—and two were anonymous. My diagnosis of the five answers leads me to separate them as follows:

Three are pharmacists, one a dispensing physician, and the last a manufacturer of non-secret preparations.

The questions submitted were as follows:

1. Where is the practice of pharmacy drifting?
2. To what cause is failure due in attempting to protect our mutual trade interests?

3. Why do a large number of wholesale druggists, and makers of non-secret preparations, supply department stores with drugs and medicine, and violate contract agreements on rebate goods with manufacturers of proprietary medicines, and what course will it compel the retailer to pursue?

4. Under what circumstances is substitution admissible?

5. Is protection of trade interests of the druggists and chemists by the manufacturer of proprietary goods a possibility; if in the negative, what is your remedy?

6. Is general substitution admissible?

7. Is it justifiable to purchase unreliable materials for the purpose of increasing profits, thereby injuring the reputation of the physician and endangering the patient's chance of recovery, thus furnishing physicians with reasons for self-dispensing?

8. Are non-secret preparations, in imitation of well-known domestic medicines, legitimate products; and is it honest for a dealer to allow his name to be printed on the label so as to give an unknown compound currency, when he is ignorant of the contents of such preparations? Why does he not prepare his own family and household remedies?

9. Does not the pharmacist jeopardize his reputation and standing by dealing in non-secrets, when he possesses the knowledge of compounding as good or better formulas?

10. Does it pay pharmacists, morally or financially, to substitute?

11. Is the claim true that physicians dispense their own medicines on the ground that pharmacists use inferior material in their preparations?

12. Where reputable pharmacists discover goods falsely labeled and below pharmaceutical standards, is it not their duty to expose such dishonesty?

13. Has excessive competition introduced "a cheap era" into the drug trade, and where will such tendency place pharmacy in the future, in its relations to the physician and the public?

14. Why are physicians' supply establishments making inroads on the business of the pharmacist? Do physicians, as a whole, especially in large cities, encourage this new departure, and what is the remedy?

15. What are the chief arguments employed to induce physicians to supply ready-made medicines to their patients; cite them, and state some facts connected with this query.

16. Where is the practice of medicine drifting? Explain the reason why.

17. If the future facilitates the art of dispensing by physicians, what is our remedy?

18. Is it not our duty to demand protection from physicians and make an effort to fuse our natural relationship by a just compromise—what should a compromise be based on?

19. What arguments have we against those who advocate that the day has arrived when any person with open store for the sale of merchandise will have a right to sell his goods to any person who comes money in hand, and demands same, irrespective of his calling or profession? In other words, why should pharmacy be protected?

20. Give reasons why it seems impossible for us to organize ourselves into solid columns when we positively know it will be to our advantage, professionally, commercially and financially.

21. What influence has compelled the retailer to enter into direct business relations with manufacturers of pharmaceutical products? How can a jobber regain such loss?

22. What will be the future of formed and forming co-operative societies among pharmacists and druggists, and what will it finally lead to?

The answer to the foregoing queries have been published throughout the United States. The humor, wit and sarcasm in the responses have been highly appreciated by our profession, which are considered an exposé of the situation and worthy of our serious consideration.

Briefly stated, the views expressed by the writers are such as to admit that commer-

cial demoralization exists in our midst, and that the business affairs of pharmacy are in a precarious condition. The chief cause of discontent has been the encroachment of the medical profession—that of trespassing, in unnecessary sections of the country, on the practice of pharmacy, especially in large cities, by not only giving medical advice, but also by furnishing medicines free of cost. Their course, if persisted in, will compel pharmacists and druggists to retaliate by undertaking, in the near future, a medical course in connection with the study of pharmacy. While such a course is repugnant to druggists, yet in self-defense they see no other remedy; but it is hoped that a compromise will soon be entered into where these disturbances will be adjusted to the mutual satisfaction of both professions.

Substitution was generally condemned, likewise the jobber that supplied department stores with drugs and medicines. They also recommend manufacturing, as far as possible, every preparation of the pharmacy that can be undertaken with profit instead of buying perfected goods, the composition of which is unknown to them; and as a final remedy, the consensus of judgment is that it is only by organization and unity that a better condition of our commercial affairs can be brought about.

The following collateral matter, while it may intrude slightly on questions that properly belong to the Boards of Pharmacy, yet its importance to Commercial Pharmacy induces me to submit it to you—it was part of my address as President of the New York State Pharmaceutical Association at Buffalo this year, and is matter that I cannot improve upon.

#### VALUE OF AN ANNUAL REGISTRATION FEE.

A great many intelligent druggists will say, what advantage or benefit do we receive in case the annual registration fee is legalized? Spontaneously, without thinking on the subject, they will answer, "I fail to see any advantage to me; it may perhaps make a fat place for some political druggist who cannot make a livelihood at his legitimate business." Fellow members, it is a pessimistic class among us that utter such sentiments, and such individuals discourage those who are willing to assist in redeeming the interests of our profession.

Let us enter into the merits of the subject.

The first advantage gained, is that the druggist becomes a member of the State Association without paying an initiation fee or dues, and if we all put our shoulders to the wheel, it gives us power and insures a solid organization; the annual fees will give us ample funds to prosecute all violations with an independent counsellor at our command.

A single State Board of Pharmacy will be incited to prosecute their work energetically, since with an inspector of pharmacy and their own lawyer to prosecute cases, they will reduce the number of commercial druggists and tradesmen so as to enable you to improve your business and profits, and your \$2.00 or \$1.00 will come back to you annually from 10 to 100 fold; it all depends on the volume of business done by each member, whether in city pharmacies or country drug stores.

The forcing of department stores into their legitimate business will stop their mail orders to farmers and the public, thereby benefiting drug stores in the smaller communities, and increasing local business in cities among pharmacists, which ultimately must lead to a restoration of prices, especially in organized centers of population.

It will influence and compel wholesale druggists and manufacturers of advertised medicines and other branches to be more loyal to their natural customers; now if it is not worth \$2.00 a year to accomplish all this, or a greater part of our possibilities, then we must just as well surrender and let nature take its course.

You will honor yourself and your profession more by paying into the treasury of a State Association the insignificant sum of \$2.00 or \$1.00, a sum that will ensure you substantial results, than to pay the incorporators of a corporation of fakirs the sum of \$5.00 for a worthless coupon, the value of which is based on false representations and promises;

the scheme itself is one evolved from reading some of the romances in the Arabian Nights. Their method of doing business is comparable to a downright swindle.

An improved condition of our commercial affairs under new regulations will increase the proprietor's income, who in turn will cheerfully advance the salaries of his assistants; therefore, even clerks should be interested in this progressive movement; they should see to it that every clerk or assistant in their neighborhood is a graduate or licentiate of pharmacy, reporting to the Board of Pharmacy any violations; they could not be classified as spies or detectives for the Board—the inspector of pharmacy would on notification secure the evidence for conviction—clerks would be entitled to praise for such voluntary service, and even be proud of it, since it enables them to assist in bringing about a better condition for themselves and pharmacy.

#### A TRIANGULAR BOOMERANG.

Advertisers of proprietary preparations, restless to extend their traffic from the legitimate channels of distribution, are now supplying their wares to department stores, arch-cutters, or to any applicant with satisfactory references or cash.

The manufacturers of so-called non-secret remedies and preparations, itching for more business, have followed the same policy and are furnishing all comers with similar goods, thereby introducing a remorseless competition, reducing the profits and volume of business transacted by druggists.

The introduction of these various methods has forced the retailer into a defensive position. We are slow to move, that we know from experience, and in order to punish our quondam friends he has been compelled to manufacture his family medicines where sufficient demand exists, or to join a growing class of co-operative manufacturing corporations established and managed by pharmacists, whereby they will be enabled to compete with all comers, holding their trade and increasing the margin of profit and supplying a more reliable class of medicines and drugs. When this practice becomes general then manufacturers of proprietary medicines and non-secret remedies will be amply repaid for supplying the retailer's worst enemies, department stores and tradesmen.

The situation is a grotesque and humiliating one to all involved; it is a natural outgrowth of conducting business on false principles; it is a case of the biter bit, or punningly, the bitter bit.

From the present temper of the retail trade, it strikes me forcibly that these formed and forming pharmaceutical co-operative societies throughout the United States among our brethren may by evolution enlarge their sphere of commercial enterprise, and it would not surprise me if the condition does not hastily improve the condition of the retailer, that they may gradually add a regular drug stock. Who knows? Stranger things have happened when the oppressed become desperate.

#### WHO SUPPLIES DEPARTMENT STORES AND ARCH-CUTTERS?

Possessing accurate records of who supplies department stores, and always anxious and willing to be just, I assert that there are a few manufacturers of advertised medicines out of the hundreds who do not supply department stores or arch-cutters, and there are perhaps twenty-five wholesale druggists in the United States in the large cities who protect the retail trade, but the fact remains that the department stores and cutters get the goods of the manufacturers of proprietary medicines who will not sell their preparations to objectionable distributors, yet you can find their products in their establishments.

Who supplies these morally contraband articles? Is it the retailer? Yes, occasionally. Is it the cutter who is able to buy direct from the manufacturer and who signs contracts? Yes, occasionally. Well, who is the Simon-pure supplier? Is it the jobber? Nine out of ten complaints can be traced to a honey-tongued, crafty jobber; in some firms they have a Dr. Jekyll who has a very accommodating partner named Mr. Hyde. If the jobber will only look after the interests of his customer and not try to make very large sales

to department stores or cutters, the war on cut prices and inferior medicines would soon be discontinued. The temptation is too great for a large group of jobbers, as department stores and arch-cutters are extremely liberal buyers—for they will say “if I don’t sell them my competitor will,” yet they never seem to consider the injury that they are doing to the trade interests of their legitimate customers. Such sales do not increase the volume of business done by the jobber a particle, only temporarily; if he refuses to supply tradesmen and arch-cutters, his customers will distribute the goods, and his annual sales would suffer no decrease whatever.

#### FREE ALCOHOL.

This subject will be disposed of by the incoming Congress; the causes preventing the fulfillment of the promises made by the previous administration are more potent than ever. Let us not delude ourselves by the consoling belief that we will be granted free alcohol for use in medicines; in many interviews with prominent statesmen and legislators, and from the rumbling sounds that issue from the Committee on Ways and Means, depend upon it, the conclusion prognosticated in this Section last year will prevail.

Proprietary medicine manufacturers, or their attorneys, have been exceedingly active in the lobbies of the capitol, but I am positive they will be disappointed; a compromise may be entered into whereby methylated or wood alcohol may be granted for the arts and manufactures, provided regulations are devised to prevent their illegal or fraudulent uses.

The free alcohol bill contains a section providing for the appointment of a joint select committee of three Representatives and three Senators who are to sit during the recess of Congress and consider all questions relating to the use of alcohol in the arts and manufactures, free of tax, frame regulations, and draft a bill reporting their conclusions to Congress next December.

#### COMMITTEE ON PROFESSIONAL RELATIONS.

I recommend to you to forge another link in our chain of trade protection. I would advise the appointment of a committee on fraternal professional relations, consisting of three in each State. The importance of such committees cannot be underestimated, since it brings the professions of medicine and pharmacy together where conferences can be held for mutual benefits. These committees should attend State, county and local medical meetings. They should be selected from members that reside nearest the meetings; at such meetings we could state our grievances and adjust them. This recommendation, if approved, should be referred to the National Committee on Trade Interests.

I renew my recommendation for the appointment of a Nominating Committee of five, to suggest names for Chairman, Secretary and Executive Committee for the ensuing year, such committee to be a standing committee and selected at each annual meeting.

To summarize our trade interests, all must confess they are still in a lamentable condition, especially in the cut-rate centres. We have only ourselves to censure, still we remain dormant on the subject of our fraternal interests and organizations. Mere groups in large cities will accomplish nothing. We must unite completely. We must organize if only to maintain and strengthen our pharmacy laws; if we fail everywhere else, let us defend and enforce our State Acts; otherwise, depend upon it, the practice of pharmacy will drift into every channel of trade and commerce. We are not dead, but surely we are sleeping a most unnatural slumber. May we soon realize the dangers that surround pharmacy and act at last like men and brethren in the conservation of our professional and commercial interests.

Upon motion of Mr. Main, seconded by Mr. Watson, the recommendation mentioned in the chairman’s address, relative to the appointment of a Nominating Committee, was adopted and the chair requested to appoint said committee.

THE CHAIRMAN: I will appoint Messrs. Mennen, Simson, Thompson, Hallberg and Ryan a committee to present names for officers of this Section for the ensuing year, and, as there will be held but one session of this Section, I will ask the Committee to report after the reading of papers has been completed.

The following preamble and resolutions, presented by Addison Dimmitt, of Louisville, Ky., were read by the Secretary and, upon motion of S. P. Watson, duly seconded, laid upon the table.

PREAMBLE: It being a known fact that all efforts on the part of the National Wholesale Druggists' Association to correct the cut-rate evil that is debasing and ruining the retail drug business of our country have proven a complete failure, therefore be it

*Resolved*, That we, the American Pharmaceutical Association, in convention assembled, do earnestly ask that the manufacturers of patent and proprietary preparations through their National Association co-operate directly with the retail druggist to the end that by thorough local organization the cut-rate system can be largely if not completely overcome.

Be it further

*Resolved*, That a copy of these resolutions be forwarded at once to the Chairman of the proprietary section of the N. W. D. A. requesting him to bring these resolutions before that honorable body, urging that if adopted, the plan be put into practical operation at once.

Respectfully submitted,

ADDISON DIMMITT.

The Chairman having called for the reading of original papers or answers to queries, the following was read by the author, Mr. Robinson, of Lowell, Mass.

#### AN ANSWER TO QUERY NO. 8.

"Are non-secret preparations, in imitation of well-known domestic medicines, legitimate products, and is it honest for a dealer to allow his name to be printed on the label so as to give an unknown compound currency, when he is ignorant of the contents of such a preparation? Why does he not prepare his own family and household remedies?"

BY EDWARD A. ROBINSON

Here are three distinct propositions; the first two of which are easily of the same family, while the third seems to have been married into the other two, by the chairman of the Commercial Section, with the evident purpose of attracting the attention of the retailer to himself, and to the possible opportunity of improving his condition financially.

As to the first query, "Are non-secret preparations in imitation of well-known domestic medicines, legitimate products?"

The merit of an original that can show value enough to suggest the possibility of successful imitation should go without saying. In the case of a proprietary medicine, the original is the pioneer, and the effort to establish it upon honest premises usually means small beginnings, self-denials, hard struggles, and discouragements on every hand. After crossing the thin ice of doubt, and fear, during which time the preparation has been winning its way with the people because of its merits, it is popularized by advertising. From a small affair, it takes on giant proportions—from obscurity, it be-

comes famous. At this point the imitator is found in the field. He comes stealthily, without public announcement, seeking to profit by and fatten on the labor and the money expended by others. He aims at the outset to deceive and to mislead the consumer.

"Take my goods," he says to the retailer; "there's money in them for you. You can sell them for less than you have to pay out for preparations which are largely advertised, and then make a big profit on them. You can urge them as 'just as good' and of your own make. The opportunity for you, is a good one, for while the big advertiser is beating the bush, you can be catching the birds."

If the imitator will deceive others, he will deceive you. His business aim in life is dishonest from the start, and it is not even logical to presume that he is a whit more honest with the retail druggist than he is with the public.

"Is it honest for the dealer to allow his name to be printed on the label so as to give an unknown compound currency, when he is ignorant of the contents of such preparation?"

The manner in which this proposition is put suggests the reply expected; viz., that it is neither honest, nor good business policy, for a retail druggist who values his reputation to recommend an article when he is ignorant of the ingredients of which that article is compounded. A dealer who so far forgets his honorable calling as to substitute for well-known, largely-advertised preparations those which are, to say the least, of doubtful worth, blinds himself to the fact that sooner or later the consumer is sure to find him out and that his reputation for honest dealing will suffer.

The leading journals of the day are from time to time calling attention to the matter of substitution, and warning the public of the impositions that are being practised upon them. I quote from a recent editorial in the New York "Times":

"There is one aspect of substituted goods which the public certainly should know about. There are many non-secret manufacturers of drugs in this country, who will put up an imitation of a medicine with the name and label of the local druggist who sells it on every package. The druggist who buys these goods has no guarantee that they are pure, and, as a matter of fact, they are frequently adulterated with comparatively harmless drugs which cost, however, much less than the real drug. The manufacturer would not care to sell them under his own name as pure, because it would injure his reputation. If the druggist put them up himself, he would not have the deliberate dishonesty to substitute cheap goods for dear ones, but by shifting the responsibility the fraud is lost sight of. It is not the manufacturer's business; it is not the druggist's business, although they are sold under his name; a profit is made all around, and only the public is the loser."

There are retail druggists, however, who will not handle non-secret preparations. A retail druggist in New York City, a gentleman who I feel satisfied must be a member of the "American Pharmaceutical Association," once said to the writer:

"I will not sell a non-secret remedy, because I do not care to assume responsibilities

for preparations of which I know nothing. I will not permit my name to be printed on the label of any article I do not manufacture myself, nor will I become the cat's-paw of a house that comes to me with any such proposition. If the goods are honest, why don't the house that makes them stand behind them, and do an honest business? They are not honest goods, and, therefore, the retailer is asked to become responsible for them, to stand between the consumer and the manufacturer. I value my trade, respect myself, do an honest business, and have neither use nor place in my store for non-secret preparations. Originals are good enough for me."

If the corner-stone of the non-secret business is laid in dishonesty, what can be expected of the rest of the structure?

The non-secret man claims to print the formula of his preparation upon its wrapper. Is the formula any more worthy of credence than are his other professions? It would seem that there could be but one opinion, one answer, to all these propositions.

"Why does he not prepare his own family and household remedies?"

It is perfectly legitimate for the retail pharmacist to prepare his own family and household remedies. To this end is he educated and eminently fitted in every particular. He can, if he have the means and the inclination, handle every detail of the process of preparing a compound for market, and he can, again, if he have the means, advertise this particular compound with profit. That he does not do this, is due in a majority of cases to the fact, that every intelligent pharmacist recognizes, that to be a successful manufacturer means to give up the retail drug business, and that the way to success in the proprietary medicine business, is too long and too hazardous to encourage abandonment of the substance of to-day for the shadows of to-morrow.

Upon motion, the paper was received and referred to the Publication Committee.

MR. HALLBERG: The paper just read is something like a paper read on the same subject last year. I desire to propose on behalf of a great many pharmacists, this general characterization of ready-made medicines, be they secret or non-secret. The gentleman who has just read this paper seems to take the ground that these inquiries must be applied only to non-secret remedies. I desire to say that there are a great many other full lines of medicines regarding which the same inquiries can be made. There are, for example, about 100 of the various combinations of tablets, at least one-half of which are of just as complicated and complex a character as any non-secret remedy, that every pharmacist and physician who uses these tablets is not able by any method, pharmaceutical or therapeutical, to tell whether they are true to the formula. I desire to call your attention to a list of about ten or fifteen formulas which I have selected from a price list of a concern which does not make non-secret goods, although it is located in a non-secret town. I desire to call your attention to about fifteen forms of tablets in which you will find that the price per thousand of the tablets is from one-third to one-half of what the cost of the ingredients is according to the list market prices. Now, I desire to ask you if you have to buy one thousand tablets for \$1.50, and you figure up the cost of the ingredients, without adding anything for the vehicle, or the labor, or the capping, or anything of that kind, and you find that the cost of the ingredients amounts to \$3.50,



what is the inference? The inference resolves itself into two inferences. Either they are practising the non-secret flim-flam business on you, or they are not putting the ingredients into these tablets which they purport to do, or that they are given directly to the business of selling these tablets for \$1.50 per thousand, and making it thoroughly impossible for you to practice your art as pharmacists. If you desire to buy these ingredients, you will have to pay \$3.50. You will then have to expend your labor. Do you not see that you are absolutely at a great disadvantage, that you are absolutely at their mercy? Now, it is not necessary for me to state which one of these inferences you desire to take; you may take one or the other. No matter which position you take, the disastrous results to you will be the same.

The Nominating Committee presented the following names for officers for the coming year:

*Chairman*: Thomas F. Main, of New York.

*Secretary*: Eugene D'Avignon, of Windsor, Can.

*Associates*: Gerhard Mennen, of Newark, N. J.; John F. Patton, of York, Pa.; Wm. L. Dewoody, of Pine Bluff, Ark.

MR. MAIN: I desire to thank the Committee heartily for the honor, but I beg to say that it is impossible for me to accept the position; I would ask that a substitute be named.

MR. GOOD: I really feel very much gratified at the result of the Committee's work, and, unless it is absolutely impossible for Mr. Main to serve as Chairman, I trust that he will consent to serve.

MR. MAIN: I say, Mr. Chairmen, that it would be impossible for me to serve this year.

On motion of A. E. Ebert, duly seconded, the name of Louis C. Hopp of Cleveland, O., was substituted for that of Mr. Main, and the secretary was directed to cast an affirmative ballot for the gentlemen nominated.

The Secretary having cast the ballot as directed, the Chairman declared the gentlemen whose names had been presented duly elected officers of the Section for the ensuing year.

Mr. Hallberg presented the following resolution, which, on motion of W. S. Thompson, seconded by Thos. F. Main, was laid upon the table:

*Resolved*, That the American Pharmaceutical Association approves of the organization by pharmacists for the manufacture and sale of medicines for popular use as being a logical plan by which the retail druggist can regain the trade lost through the encroachment of the cut-rate establishments and the indifference of the jobber, and that it is believed to be the best means by which the pharmacists of the United States may obtain relief from the patent medicine monopoly.

The Chairman-elect not being present, the installation of officers was deferred.

On motion of Mr. Dohme, a vote of thanks was tendered to the retiring officers.

No further business being presented, and the reading of the minutes, on motion, dispensed with, the Section, at 5.45 p. m., adjourned until the next annual meeting of the Association.

# MINUTES

## OF THE

# SCIENTIFIC SECTION

FIRST SESSION—FRIDAY, AUGUST 14, 1896.

The Section was called together at 11 a. m. by the Chairman, Prof. S. P. Sadtler, who then proceeded to deliver the following address :

### ANNUAL ADDRESS OF THE CHAIRMAN.

*Fellow-members of the American Pharmaceutical Association :*

We have met this morning in Scientific Section, and it may not be amiss to devote a few moments to some thoughts on our position in the great family of scientific students and workers.

I will not stop to answer the sneering question sometimes asked as to whether the pharmacist is entitled to call himself a scientific man. That is his birthright, and if he traces back the early history of chemistry, botany, or even medicine, in its primary meaning as the curative art, he will find that they were cradled and fostered in the pharmacist's shop. If the modern pharmacist occasionally sells his birthright for the pottage of commercial gain, it can not take from the earnest and conscientious worker inherited claims to a broad and important field of scientific activity.

Where does this field lie, and what are its bounds?

We answer, first, that a field peculiarly allotted to the pharmacist who wishes to do his share as a scientific man is that of pharmacognosy, or the study of natural raw materials with reference to the medicinally active principles they contain, the identification and tests for them, the best methods for their extraction and purification, and their character as medicines or poisons, etc. The study of this field it is true antedates the history of modern chemistry, and in the Iatro-chemists of the 17th and 18th century, we recognize the scientific pharmacists of those days. That we have a mass of information as the result of the labor of the hundreds of industrious workers, in this great field may be seen if we glance through some of the great classics on this subject, such as Husemann & Hilger's *Pflanzenstoffe*, Wittstein's *Handwörterbuch der Pharmacognosie*, Wiesner's *Rohstoffe des Pflanzenreiches*, Planchon's *Les drogues simples d'origine végétale*, Pennetier's *Matières Premières Organiques* and Flückiger and Hanbury's *Pharmacographia*; and, that the field is not exhausted is learned by reading the monthly issues of the *American Journal of Pharmacy*, the *Pharmaceutical Review*, and similar journals, and the yearly report on the progress of Pharmacy, the *Jahresbericht der Pharmacognosie*, etc.

But it is not only the natural sources of medicinally active principles that should occupy the scientific pharmacist's attention. The raw materials which yield food preparations and those which are the basis of many large chemical industries equally furnish sub-

jects which may properly attract the working investigator of the pharmaceutical profession.

Few of us realize how extensive this field is, and what enormous quantities of unutilized material yet remain calling for investigation.

In Philadelphia we have the beginnings of a great Commercial Museum and, although it is only provisionally arranged and in temporary quarters, it makes a bewildering show of the raw materials and partially manufactured products from all parts of the world, filling four floors of a very large building and 200,000 square feet of space. It was chiefly gathered from the great wealth of foreign exhibits which most of us remember to have seen in the Columbian Exposition at Chicago in 1893. Here are materials for investigation for dozens of pharmaceutical chemists and the results could not but be of great and perhaps far-reaching value.

Still another field which the pharmacist should have, but which he has practically lost by inability to work it, is that of synthetic organic remedies.

Who are the manufacturers of these compounds which have made such an impression upon medical practice within the last decade? The great coal-tar color manufacturing firms of Germany:—and we pay from four to six prices for these products in consequence. They have the matter in their hands because they keep a corps of scientific investigators at work on these lines and command their whole time and efforts. When our large manufacturers of pharmaceutical products are willing to employ and pay a corps of chemists one-fourth as large as that kept by some of these German Companies, they will find that much that now comes to us from the other side of the water could be made here, and profitably too.

I may be permitted to enlarge a little on this point, as I feel strongly upon it as a Professor of Chemistry in an educational institution which stands ready to turn out young men with a chemical training, and to point out the difference between German manufacturers' methods and those so far followed by us, and to quote from a recent address before the New York Section of the Society of Chemical Industry by Dr. C. Duisberg, the technical director of The Farbenfabriken, vormals Friederich Bayer und Co., of Ebersfeld, Germany. He says: "We not only try to make use of all the derivatives of the tar from wood and coal for the production of aniline and alizarin dye stuffs of all possible descriptions and also of very diverse pharmaceutical products, such as phenacetin, sulphonal, trional, salicylic acid, somatose (a new alimentary product), saccharine, etc., but we produce also the inorganic products necessary for their manufacture, such as sulphuric, hydrochloric and nitric acids, chlorine, etc., and a large number of intermediate organic products. In our works there are at present about 100 chemists having a university education and about 25 engineers who have been trained at a technical high school. They are recruited from almost all the universities and technical high schools of Germany, and the greater number have been engaged by me personally during the last ten years."

Can we doubt that if to German thoroughness of this kind we were to add American energy, we might expect equal if not greater results?

However, I am afraid that my audience are beginning to think that I have mistaken them for a chemical society and am unable to talk anything but shop.

My apology must be that the difficulty lies in the subject, and that the scientific pharmacist must be a chemist if he would be a thorough pharmacist, and hence my talk must be apropos after all.

Let us turn, however, to the question of the methods of study and research which the modern worker in scientific pharmacy should follow.

Those of us who completed our college education from twenty-five to thirty years ago will remember the relatively simple character of scientific studies of that day as compared with what seems necessary for a properly educated man now.

The reasons for this difference are two-fold. A wider range of studies must be cov-

ered, owing to the broader demands which modern society makes of her educated citizens, and the interdependence of the several branches of science is constantly becoming greater. For instance, a thorough pharmaceutical chemist now-a-days must be more than a simple analyst. He must have a good foundation of mathematical physics to enable him to understand modern chemical theory, especially with the rapid development of electrolytic theory and methods; he ought to be an adept with the microscope and have a good working knowledge of botany; he should be acquainted with the most recent advances in bacteriological methods, as many pharmaceutical preparations can only be made by such means.

If we take the manipulative side of the pharmacist's training, what wonderful advances have been made in the making of elegant preparations as compared with those with which we would have been satisfied two or three decades ago. In many branches of study which were formerly taught in a purely didactic way, laboratory methods of study have been introduced, as in botany, pharmacology, etc.

The field before the scientific student of pharmacy has therefore broadened, the methods of study have become more diversified and varied, and the resources and facilities of our schools have been correspondingly increased. If we are as interested in the advance of pharmacy as we claim to be, let us not fail to be equal to our opportunities.

Pharmacists have taken a high rank in the past as investigators and discoverers in science; the present leader in electro-metallurgical research and discovery in Europe is a professor in the Superior Pharmacy School of Paris—Henri Moissan, and the field of experiment with us is just as open to the pharmacist as to any other class of scientific students.

Let the influence of this Association be thrown with all the weight we can give it in favor of the cultivation of the field which belongs to us.

To this end the action taken last year, at the suggestion of my predecessor in this chair, of forming a Committee of Research, would seem to be eminently proper. It has not yet, however, been productive of very extensive results. Possibly if the committee were made larger and more representative, including more of the centres of pharmaceutical research, it might be made to accomplish more.

While I make no recommendations on this subject, it is a matter which could well occupy the attention of the Section at one of its sessions. By a free interchange of opinion we could learn how to best stimulate the activity of all interested in this most desirable work.

On motion of C. A. Mayo, duly seconded, the address was referred to the Publication Committee.

The Chairman having called for reports of standing and special committees, Mr. Kebler, Chairman of the Committee on Indicators, read the following :

#### REPORT OF COMMITTEE ON INDICATORS.

##### *Mr. Chairman and Members of the Association :*

Your Committee appointed at Asheville, N. C., and continued at Denver, Colorado, to investigate the question of indicators in the titration of alkaloids, desire to submit the following report: The committee secured the continued kind services of Prof. Lloyd, of Cincinnati, and the assistance of Prof. Bennett, of Ames, Iowa; Dr. Engelhardt, and Prof. Base, of Baltimore. Considerable difficulty was experienced in securing some of the indicators of a satisfactory quality. This was especially true of Tropæolin OO and Iodo-eosin. Of the former none was secured sufficiently sensitive, in the chairman's opinion, but another member of the committee considered it satisfactory. Only one sample of

iodo-eosin was obtained. After considerable correspondence Messrs. Merck & Co. made it to order. On account of pressure of work the chairman was unable to verify every step before the outlines were submitted to the various workers. All of the material to be operated on, including the indicators, was sent to each worker. The alkaloids were sent in bottles sealed with paraffin, to avoid loss of any sort. Accompanying the material were the following instructions of the chairman:

ON THE TITRATION OF ALKALOIDS—INDICATORS TO BE EMPLOYED.

*Brasil Wood*.—Boil 25 Gm. of the cut wood with 50 Cc. of distilled water for five minutes, cool, strain, and add enough water through the strainer to make up to 50 Cc.; add 10 Cc. of alcohol to the strained extractive, and filter. Use 10 drops per titration.

*Cochineal*.—Digest 10 Gm. of the powdered cochineal, at the ordinary temperature, with 100 Cc. of 25 per cent. alcohol for one day, filter and make up to 100 Cc. with 25 per cent. alcohol. Use five drops per titration.

*Hamatoxylin*.—Dissolve 1 Gm. of the well-crystallized material in 10 Cc. of alcohol. Use three drops per titration.

*Lacmoid*.—Dissolve one Gm. in 500 Cc. of 50 per cent. alcohol. Use five drops per assay.

*Tropaeolin OO*.—Dissolve 1 Gm. in 500 Cc. of 50 per cent. alcohol. Employ five drops per assay.

*Iodo-eosin*.—Dissolve one Gm. in 10 Cc. of alcohol. Use three drops per titration.

PREPARATION OF STANDARD SOLUTIONS.

*Normal Sulphuric Acid*.—Prepare an approximately normal acid solution. Employ well-boiled water for all solutions and work.

In a tared capsule, carefully weigh out a suitable quantity of the acid solution, render alkaline with 28 per cent. ammonia water, free from any non-volatile matter, and evaporate to dryness in an air-bath from 110° to 115° C.

After evaporating to dryness, cool, moisten the residue with ammonia water and again evaporate to dryness, as before, to a constant weight. From the ammonium sulphate thus obtained calculate the strength of the acid solution, and dilute accordingly. Again evaporate a given weight of the acid as above, so as to eliminate any possible error.

*Normal Hydrochloric Acid*.—Prepare an approximately normal hydrochloric acid solution. In a beaker weigh out a convenient quantity of this solution, add an excess of silver nitrate solution, and a few drops of nitric acid; heat and stir briskly. Place the beaker and contents into a warm, dark place for two hours, filter and wash the silver chloride with hot water until the filtrate no longer yields a precipitate on adding hydrochloric acid. Dry the precipitate, remove it from the filter into a crucible as completely as possible, incinerate the filter paper and add the resulting ash to the precipitate, ignite the mixture so that all possible carbon shall be burned, cool, add a few drops of nitric acid, carefully evaporate to dryness to avoid spurring. On cooling, add a few drops of hydrochloric acid, evaporate to dryness on a water-bath, then ignite until the argentic chloride begins to fuse. From the amount of silver chloride thus obtained, less the ash of the filter, calculate the strength of the acid and dilute accordingly.

*Normal Potassium Hydroxide Solution*.—From chemically pure alcoholic potash prepare a normal solution of potassium hydroxide by titrating against the above normal acid solutions, employing haematoxylin as indicator.

From the above acid solutions carefully prepare decinormal acid solutions. From the alkaline solution prepare a centinormal alkaline solution. Carefully titrate 10 Cc. respectively of the decinormal acid solutions with the centinormal alkaline solution, using the several indicators, and report the number of cubic centimeters of centinormal alkaline solution required per indicator.

## DIRECTIONS FOR OPERATING ON SAMPLES.

	Quinine.	Cinchonine.	Strychnine.	Brucine.	Morphine.	Atropine.
Decinormal Factors	0.0378	0.0294	0.0334	0.0394	0.0303	0.0289

Work with some material on hand before taking up the samples.

With quinine and cinchonine use the hydrochloric acid solution, with all other alkaloids employ the sulphuric acid solution, and if time and material permit, the hydrochloric acid solution also. In order that there may be enough alkaloidal solution use 5 Cc. instead of 10 Cc. with the hydrochloric acid solution. Use all the indicators with all the alkaloids.

For preparing the alkaloidal solution, proceed as follows: Place two grams of the alkaloid into a 200 Cc. beaker, add 75 Cc. decinormal acid solution, warm the contents of the beaker on a water bath, agitating occasionally, until the alkaloid is dissolved. The beaker is then removed, cooled, and its contents transferred to a 100 Cc. graduate; the beaker carefully rinsed with several portions of water, and the several portions transferred to the graduate. Finally make up to 100 Cc. at the normal temperature. Each 10 Cc. contains 0.2 Gm. of alkaloid and 7.5 Cc. of decinormal acid solution. Titrate back the excess of acid with centinormal potassium hydroxide. It is well to make two or more titrations in every case, with the same solution and indicator, by adding to the solution just finished 1 Cc. of decinormal acid solution and re-titrating with the alkaline solution, taking finally the average reading. Report the percentage of pure alkaloids represented by each indicator.

## FLUID EXTRACT OF COCA LEAVES.

10 Gm. of the fluid extract are diluted with 10 Gm. of distilled water in a 250 Cc. flask, 25 Gm. of chloroform and 75 Gm. of ether added, the vessel securely stoppered, and well agitated. Add 5 Gm. of 10 per cent. ammonia water and agitate the mixture frequently during half an hour.

*a.* When the mixture has completely separated, pour off fifty grams of the chloroform-ether mixture into a flask or beaker, evaporate the solvent on the water-bath, add 10 Cc. of ether and evaporate again. Dissolve the varnish-like residue in 15 Cc. of alcohol with heat, add water to slight permanent turbidity, add indicator and slight excess of acid solution and re-titrate with centinormal alkaline solution.

*b.* When the mixture has separated entirely, pour off fifty grams into a separatory funnel, treat at once with 20 Cc. of acidulated water; after thorough agitation and complete separation, remove the 20 Cc. of water into a second separatory funnel. Repeat the above operation twice more with 15 Cc. of acidulated water. The acidulated water in the second separatory funnel is rendered alkaline with ammonia water, the alkaloids removed successively with 20 Cc. and 15 Cc. of a mixture of three parts (by volume) of chloroform and one part of ether. Collect the chloroform-ether mixture in a tared flask and distill off the solvent. The varnish-like residue is twice treated with 8 Cc. of ether, evaporated on a water-bath, finally dried on a water-bath and weighed. The varnish-like residue is now dissolved in 15 Cc. of alcohol, with the aid of heat, then proceed as in "*a*" above. Report the percentage of alkaloids gravimetrically, and volumetrically as represented by the various indicators, using 0.0303 as the decinormal factor.

## POWDERED NUX VOMICA AND COCA LEAF.

Place 10 grams of the dry drug into a 250 Cc. flask, add 25 grams chloroform, 75 grams ether, stopper flask securely, agitate well for several minutes, add 10 grams of 10 per cent. ammonia water, agitate frequently and well during one hour. The suspended powder separates almost immediately, and the alkaloids are dissolved. On adding 10 grams more of ammonia water and shaking well, the powder agglutinates into a lump, the liquid becomes clear after standing a few minutes, and can be poured off almost completely. Treat 50 grams of the chloroform-ether mixture from nux vomica, according

to process "a" and "b," the coca leaf according to processes "b." Report the percentage of alkaloids in each as obtained by the several indicators, using 0.0303 as the decinormal factor of coca leaves, and 0.0364 as decinormal factor for nux vomica.

#### REPORT OF J. U. LLOYD.\*

##### PREPARATION OF INDICATOR SOLUTIONS.

In the case of lacmoid the directions could not be followed, as the indicator proved to be very sparingly soluble in fifty per cent. alcohol.

Of the weak solution obtained, from twenty to thirty drops were employed, as the special case seemed to require.

##### PREPARATION OF STANDARD SOLUTIONS.

As regards the acid solutions, approximately decinormal solutions were prepared and their actual strength ascertained by the methods directed by Mr. Kebler for normal solutions. Finally the solutions were diluted to the proper standard.

The centinormal caustic potash solution was also prepared directly by means of alcohol, the best obtainable commercial caustic potash, U. S. P., being employed; the carbonate was thereby excluded. The approximately centinormal caustic potash solution was titrated against the decinormal sulphuric acid, hæmatoxylin being used as an indicator, and finally the solution was diluted to standard strength and kept in paraffined bottles, as there is reason to believe that the solution increases in strength in glass bottles by dissolving alkali from the glass.

The same quantity of both decinormal acid solutions then required for neutralization exactly equal amounts of caustic potash solution. This fact proved the acid solutions to be of identical standard. In each and every one of the following titrations a record was made of the changes in tint, a few examples of which will be appended; if desirable, these notes will be furnished in detail.

The following table (I) gives the number of Cc.  $\frac{N}{100}$  KOH required to neutralize 10 Cc. of  $\frac{N}{100}$  HCl and of  $\frac{N}{100}$  H<sub>2</sub>SO<sub>4</sub>.

The figures that follow are all averages of values observed, within close limits, around the point of change in tint.

TABLE I.

	$\frac{N}{100}$ HCl.	$\frac{N}{100}$ H <sub>2</sub> SO <sub>4</sub>
Hæmatoxylin .....	99.7 (†)	99.7 (†)
Brazil wood.....	99.7	99.7
Cochineal .....	99.6	99.7
Lacmoid .....	99.7	99.87

Tropæolin OO and iodo-eosin proved to be useless in these and all the subsequent titrations.

Hæmatoxylin is probably the best of these indicators, as the change of tint is very striking. Cochineal, Brazil wood and Lacmoid are fairly sharp indicators in this case.

There is no material difference as far as results are concerned, in the use of  $\frac{N}{100}$  HCl or  $\frac{N}{100}$  H<sub>2</sub>SO<sub>4</sub> with the different indicators.

\* For experimental work and assistance credit is due to Dr. Sigmund Woldbott, to whose patience and precision is due the perfection of this work.—J. U. L.

† The caustic potash purposely was not corrected to 100.00.

TABLE II.

	$\frac{N}{10}$ HCl.		$\frac{N}{10}$ H <sub>2</sub> SO <sub>4</sub> .			
	Quinine.	Cinchonine.*	Morphine.	Strych.	Brucine.	Atropine.
Hæmatoxylin .....	109.78	111.68	97.18	95.55	92.55	98.86
Brazilwood .....	109.02	111.52	97.08	95.66	92.53	98.82
Cochineal .....	—	—	97.66	96.07	92.92	98.97
Lacmoid .....	—	—	97.61	96.14	92.79	99.13

With Quinine and Cinchonine, Hæmatoxylin and Brazil wood are the only useful indicators. Hæmatoxylin seems to require the addition of water to give sharply discernible changes in tint. Cochineal yields a purple liquid from the start. Lacmoid yields a blue fluid even in acid solution.

TABLE III.

This table shows the comparative value of indicators with all the alkaloids herein considered :

	Quinine.	Cinchonine.	Morphine.	Strych.	Brucine.	Atropine.
Hæmatoxylin ..	Good.	Good.	Change rapid and sharp.	Delicate.	Very sharp.	Extremely sensitive.
Brazil wood...	Fair.	Fair. (Not very distinct changes.	Change is slow, not very distinct.	Fair.	Good.	Rather sharp.
Cochineal.....	Useless, purple from the beginning in faintly acid solution.		Rather good.	Good.	Rapid and sharp.	Very sensitive.
Lacmoid.....	Useless.		Change of tint rapid.	Rather sharp.	Sharp in dil. solution.	Excellent.
Tropæolin, OO. } Iodo-eosin .... }	Useless in all cases.					

## ASSAY OF GALENICAL PREPARATIONS.

The assay method *a*, for both Coca fluid extract and Nux Vomica cannot give accurate results, owing to the disturbing influences of Chlorophyll and fatty matters.

Still, some results were with difficulty obtainable in the case of Coca fluid extract, using Hæmatoxylin and Cochineal, and of Nux Vomica with Hæmatoxylin, Brazil wood and Lacmoid.  $\frac{N}{10}$  H<sub>2</sub>SO<sub>4</sub> was used throughout these determinations. Preliminary work was done in nearly every case by means of samples collected, with as little delay as possible, from the remnant fluids.

The gravimetric results are naturally considerably higher than those obtained by titration. Process *b* yields the alkaloids in pure condition.

In the case of fluid extract of Coca, fluid measure (10 Cc.) was employed instead of 10 Gm. Experiment demonstrated that at the prevailing temperature 10 Cc. of fluid extract of Coca weighed 9.3863 Gm., which fact was employed in our calculations.

In all other respects the directions given by Mr. Kebler were strictly adhered to.

The powdered drugs were employed air-dry.

Results are laid down in Tables IV and V.

\* This figure is higher than that calculated for pure Cinchonine. Repetitions of the work, however, support the figures given.



TABLE IV.

	Coca, fluid extract.		Coca, powdered.	
	Method A.	Method B.	Method B.	
		Per cent. by weight.	Per cent. by titration.	Per cent. by titration.
Hæmatoxylin .....	{ 0.217	0.522	0.263	
		0.547	0.286	1.186
Brazil wood.....	{ —	0.513	0.338	0.912
		0.464	0.355	1.272
Cochineal .....	0.262	0.575	0.294	0.694
Lacmoid .....	{ —	0.665	0.343	0.936
		0.569	0.378	0.672

## NUX VOMICA, POWDERED.

	Method A.	Method B.	
	Per cent.	Per cent. by weight.	Per cent. by titration.
Hæmatoxylin .....	2.37	2.87	2.45
Brazil wood.....	2.28	2.64	2.30
Cochineal .....	—	2.73	2.36
Lacmoid .....	2.59	2.78	2.48

TABLE V.

	Coca, fluid extract.		Coca, powdered.	Nux Vomica, powdered.	
	Method A.	Method B.	Method B.	Method A.	Method B.
Hæmatoxylin ...	Fairly good.	Good.	Good.	Fairly good.	Very good.
Brazilwood. ....	Useless.	Good.	Fairly good.	Fairly good.	Fairly good.
Cochineal. ....	Fairly good.	Good.	Very good.	—	Good.
Lacmoid. ....	Useless.	Fairly good.	Fairly good.	Fairly good.	Good.

Specimens of the notes taken in titrating alkaloidal solutions.

*Coca Fluid Extract, Method B.*

(9.3863 grams employed = 10 Cc.)

## Cochineal.

Sample No. III. = 0.027 Gm. = 0.575 per cent. alkaloid by weight.

Dissolve in 15 Cc. alcohol, water added to slight turbidity.

Cochineal added, deeply purple.

1 Cc.  $\frac{N}{10}$   $H_2SO_4$  added.

$\frac{N}{100}$  KOH 0.00, light-yellow orange.

(a) ..... 5.50, sudden change to darker.

5.58, red tint.

5.88, violet tint.

6.40, deep purple.

1 Cc.  $\frac{N}{10}$   $H_2SO_4$  added, yellow orange again.

(b) ..... 15.30, purplish.

15.78, strongly purplish.

16.05, more so.

1 Cc.  $\frac{N}{10}$   $H_2SO_4$  added, light yellow orange.

25.15, purple suddenly appears.

(c) ..... 25.60, plain purple.

(a) 5.50, = 0.295 per cent.

(b) 5.30, = 0.303 per cent. Average, 0.294 per cent.

(c) 5.60, = 0.284 per cent.

*Nux Vomica, Powdered Drug, Process B.*

10 gms., air-dried. 100 gms. Ether-chloroform, 50 gms. employed.

Hæmatoxylin.

Preliminary sample.

Obtained: 0.1350 gms. alkaloids = 2.7 per cent. by weight.

Dissolved in alcohol, water added, then indicator, and 5 cc.  $\frac{N}{10}$   $H_2SO_4$ ,

$\frac{N}{100}$  KOH.

- 0.00, bright yellow.
- (a) ..... 17.45, change begins.  
18.36, dirty violet.  
19.40, whole fluid blue,  
20.30, bluish violet.
- 1 Cc.  $\frac{N}{10}$   $H_2SO_4$  added, light yellow again.  
26.80, change to violet begins.  
27.49, decided change to violet.
- (b) ..... 27.84, plainly violet. Better visible upon dilution.  
28.45, violet.  
30.30, blue.
- 1 Cc.  $\frac{N}{10}$   $H_2SO_4$  added, greenish-yellow.
- (c) ..... 38.15, sudden change to violet.  
39.70, blue.
- (a) 17.45 = 2.37 per cent.  
(b) 17.84 = 2.34 per cent. Average, 2.34 per cent.  
(c) 18.15 = 2.32 per cent.

## SUMMARY.

Hæmatoxylin gives good results in all cases, and is especially sensitive in the case of atropine. In very dilute solution its characteristics as an indicator become conspicuous.

Brazil wood is useful in the cases of brucine, atropine and coca fluid extract, Method B, but merely fair in the cases of quinine, cinchonine and others.

Cochineal is prominently useful in the cases of brucine, atropine, coca powdered and nux vomica, Method B, but useless with quinine and cinchonine.

Lacmoid is a good indicator with atropine, morphine, strychnine and brucine, and fairly good in other cases. For details see tables and notes.

Process B. in the assay of the galenicals under consideration, is decidedly to be preferred both for elegance of manipulation and the purity of the alkaloids obtained.

The need of a sensitive indicator is more directly observed with Coca (having low percentage of alkaloid) than with Nux Vomica. A preparation weak in alkaloid, like Coca fluid extract, may therefore be assayed by titration to greater advantage, if a larger amount be used and evaporated down to a smaller volume.

In connection with the subject of the use of indicators in the titration of alkaloids, the following note may be pertinent.

The Chemist and Druggist, 1896, No. 846, July 4th, p. 22. Titration of Quinine, by A. H. Allen. From "Analyst," 1896, 21, p. 85.

"Phenolphthalein is quite unsuitable as an indicator, and litmus is not much better, in titrating alkaloids generally.

"As to quinine, the fact has to be remembered, that the ordinary quinine sulphate of commerce, though practically neutral to Brazil wood, logwood and cochineal, is slightly alkaline to methyl orange, so that the end reaction with the last mentioned is when the acid sulphate is formed, while with Brazil wood, etc., the end point comes when half as much acid is used. The sparingly-soluble sulphate,  $Qu_2H_2SO_4$ , is distinctly alkaline to litmus, and hence this indicator cannot be conveniently used for the titration of quinine,

though the end reaction is well marked. It is highly important, therefore, that workers should be particular in the use of these indicators.

"Mr. Allen adds that experiments made in his laboratory on the titration of cinchonine and cinchonidine with various indicators have led to such anomalous results as to render it doubtful if the constitution of these bases, or at least, the composition of the commercial article, is correctly understood."

The results for cinchonine in the preceding Table (II) seem to confirm the latter view.

#### REPORT OF CHAS. CASPARI, JR., AND DANIEL BASE.

##### GENERAL REMARKS.

1. All work was done with calibrated burettes and flasks, and all readings from the burette made with the aid of Erdmann floats and a lens, appropriate corrections being made in every instance, as indicated by carefully plotted curves. The apparatus used was calibrated by means of a set of calibrating pipettes kindly loaned by Prof. Morse, of the Johns Hopkins University. (For description of these pipettes see *Amer. Chem. Jour.*, Vol. xvi, 1894, p. 479.)

2. Both the decinormal, sulphuric and hydrochloric acids employed were standardized by means of precipitation, the former as barium sulphate and the latter as argentic chloride. The alkali solution was standardized against both acids, phenolphthalein being used as the indicator.

3. Hydrant water could not be used even after it had been well boiled for thirty minutes, as an alkaline reaction was shown with every indicator; pure distilled water was used throughout the work.

4. In order to establish a suitable end reaction for each indicator, by means of which it might be possible to detect the first excess of alkali added, the following color indications were fixed upon and maintained throughout the work: For hæmatoxylin, the first appearance of a permanent purple tint; for cochineal, the color produced by adding the indicator to distilled water, the quantities used being the same as in the volumetric test to be made; for Brazil wood, the first appearance of a permanent pale pink color, free from yellow; for tropæolin OO the entire extinguishment of a red tint, a mixture of distilled water and indicator in same proportions as the acid solution being used for comparison; in the case of lacmoid it was found most desirable to acidulate faintly a mixture of indicator and distilled water for comparison, and then to titrate to the first decided change from the tint thus obtained to a bluish color. Iodo-eosin was found worthless except in the case of plain acid and alkali solutions.

5. The tropæolin OO sent out by the chairman was not used on account of its lack of sensitiveness. A superior article obtained from the Johns Hopkins University was found to be very sensitive, and its subsequent use showed this indicator to be a very desirable one for the work contemplated, the results running extremely close to those obtained with hæmatoxylin.

6. Alcohol was omitted in all cases where its use had been prescribed, as it was found to interfere with the accuracy of the results.

7. Quinine and cinchonine were found unsuited for volumetric determination with the indicators in the manner proposed, since in every instance results entirely too high were obtained, ranging from 107.5 to 117 per cent. and over. The color indicators in no case permitted of a sharp reading, being influenced by the presence of the alkaloids to a marked but varying degree.

8. In the work prescribed for powdered nux vomica, powdered coca leaf and fluid extract of coca leaf, a larger quantity of the respective drugs was extracted with the alkaline solvents instead of making separate extractions for each indicator, and an aliquot part of the resulting solution, representing the prescribed weight of the drug, taken for each determination. This was done for the double purpose of saving time and of ren-

dering the gravimetric results, to be afterwards titrated, more uniform. Since official fluid extracts are made of such a strength that 1 Cc. represents 1 Gm. of the crude drug, the fluid extract of coca used was measured with an accurate pipette, instead of being weighed as prescribed in the directions.

NUMBER OF CC.  $\frac{N}{100}$  KOH SOL. REQUIRED TO NEUTRALIZE 10 CC.  $\frac{N}{10}$   $H_2SO_4$  AND 10 CC.  $\frac{N}{10}$  HCL. RESPECTIVELY WITH THE SEVERAL INDICATORS.

Indicators.	For $\frac{N}{10}$ $H_2SO_4$ .		For $\frac{N}{10}$ HCl.	
	Caspari.	Base.	Caspari.	Base.
Tropæolin OO' .....	97.87	97.86	97.85	97.90
Hæmatoxylin.....	98.04	97.89	98.12	98.20
Cochineal .....	98.00	97.97	98.03	98.01
Brazil wood .....	97.89	97.87	97.83	97.82
Lacmoid .....	98.24	98.17	98.63	98.55
Iodo-eosin.....	97.51	97.44	97.31	97.55

The equivalent of 1 Cc.  $\frac{N}{100}$  KOH solution in  $\frac{N}{10}$  acid was determined for each indicator, so that accurate calculation as to percentage could be made in all subsequent determinations called for in the work.

## PER CENT. OF ALKALOIDS FOUND IN NUX VOMICA.

Determined Gravimetrically.	Indicator.	Determined by Direct Titration.		Determined by Titration after Gravimetric Determination.	
		Caspari.	Base.	Caspari.	Base.
2.76	Tropæolin OO .....	2.58	2.60	2.37	2.36
	Hæmatoxylin .....	2.43	2.43	2.36	2.34
	Cochineal .....	2.57	2.55	2.37	2.37
	Brazil wood .....	2.48	2.44	2.31	2.32
	Lacmoid .....	2.56	2.64	2.38	2.39

## WEIGHT OF ALKALOID FOUND IN 10 CC. OF FLUID EXTRACT OF COCA.

Determined Gravimetrically.	Titration after Gravimetric Determination.		
	Indicator.	Caspari.	Base.
0.0471 Gm.	Tropæolin OO.....	0.0455 Gm.	0.046 Gm.
	Hæmatoxylin .....	0.0448 "	0.045 "
	Cochineal.....	0.0442 "	0.045 "
	Brazil wood.....	0.0437 "	0.044 "
	Lacmoid .....	0.0448 "	0.045 "

## PER CENT. OF ALKALOIDS FOUND IN COCA LEAF.\*

Determined Gravi- metrically.	Titration after Gravimetric Determination.		
	Indicator.	Caspari.	Base.
1.05	Tropæolin OO .....	0.948	0.930
	Hæmatoxylin .....	0.923	0.910
	Cochineal .....	0.916	0.920
	Brazil wood .....	0.880	0.890
	Lacmoid .....	0.917	0.940

## PER CENT. OF PURE MORPHINE FOUND IN SAMPLE OF MORPHINE SENT.

Indicator.	Caspari.	Base.
Tropæolin OO .....	98.55	98.93
Hæmatoxylin .....	98.46	98.60
Cochineal .....	98.58	98.66
Brazil wood .....	98.32	98.35
Lacmoid .....	98.91	98.99

## PER CENT. OF PURE STRYCHNINE FOUND IN SAMPLE OF STRYCHNINE SENT.

Indicator.	Caspari.	Base.
Tropæolin OO .....	97.19	96.97
Hæmatoxylin .....	97.03	97.08
Cochineal .....	97.43	97.64
Brazil wood .....	96.53	96.75
Lacmoid .....	98.03	98.00

## PER CENT. OF PURE ATROPINE FOUND IN SAMPLE OF ATROPINE SENT.

Indicator.	Caspari.	Base.
Tropæolin OO .....	100.02	99.99
Hæmatoxylin .....	99.89	99.99
Cochineal .....	100.08	100.09
Brazil wood .....	99.75	99.80
Lacmoid .....	100.39	100.28

## PER CENT. OF PURE BRUCINE FOUND IN SAMPLE OF BRUCINE SENT.

Indicator.	Caspari.	Base.
Tropæolin OO .....	91.62	91.70
Hæmatoxylin .....	93.24	93.30
Cochineal .....	94.17	94.43
Brazil wood .....	93.19	93.50
Lacmoid .....	93.24	93.78

\*The sample of coca leaf was found wrapped in paper, and had been kept in that condition for nearly three months prior to valuation; moisture was not determined.

## REPORT OF A. R. L. DOHME AND H. ENGELHARDT.

The solution of the indicators and the volumetric acid and alkali solutions were made according to the directions of the chairman, sulphuric acid being used for all alkaloids, except quinine and cinchonine, for which decinormal hydrochloric acid was used. The following indicators were used. Brazil-wood, Hæmatoxylin, Cochineal, Methyl-orange (Tropæolin OO), and Lacmoid. We found the erythrosin, rosolic acid and others tried to possess no value for our purposes. Titration is largely a personal matter, judgment of colors and their shades and changes varying with each individual investigator. The work of this committee has shown that quantitative analysis of alkaloids in drugs can very accurately be made by the use of volumetric solutions of acids and alkalies, and that Brazil-wood, Cochineal, Hæmatoxylin and *pure* Tropæolin OO, all correctly indicate, by their color changes, the change from the acid to the alkaline condition of alkaloidal solutions. Below are given the results obtained by us:

	Atropine.		Morphine.		Strychnine.		Brucine.		Cinchonine.		Quinine.	
	D	E	D	E	D	E	D	E	D	E	D	E
Brazil wood.....	100.00	99.86	98.75	98.80	99.60	96.57	95.9	94.0	94.2	121.8	100.0	125.7
Hæmatoxylin.....	100.00	99.43	99.0	98.5	99.30	95.65	96.7	93.6	94.3	122.7	100.3	126.7
Cochineal.....	100.60	100.00	99.3	100.18	99.90	97.46	97.3	94.8	99.8	122.4	101.6	127.5
Tropæolin OO.....	.....	101.15	.....	99.43	99.70	96.86	97.0	94.8	.....	121.8	101.4	123.3
Lacmoid.....	100.80	100.70	99.2	99.26	99.70	97.46	97.3	95.3	90.3	122.6	101.6	126.0

	F. E. Coca "A" vol.		F. E. Coca "B" grav.		F. E. Coca "B" vol.		Coca Leaves "B" vol.		Nux Vom. "A" grav.		Nux Vom. "B" vol.		Nux Vom. "A" vol.	
	D	E	D	E	D	E	D	E	D	E	D	E	D	E
Brazil wood.....	0.30	0.27	0.43	0.28	0.26	0.26	.....	0.47	.....	2.88	.....	2.07	2.14	2.09
Hæmatoxylin....	0.28	0.22	0.45	0.30	0.32	0.25	.....	0.43	.....	3.17	.....	2.06	2.44	2.58
Cochineal.....	0.25	0.25	0.43	0.32	0.24	0.27	.....	0.46	.....	3.30	.....	2.18	2.75	2.76
Tropæolin OO..	0.27	0.19	0.47	0.32	0.21	0.18	.....	0.44	.....	3.12	.....	2.21	3.15	3.01
Lacmoid.....	0.31	0.22	0.47	0.32	0.26	0.22	.....	0.38	.....	3.26	.....	2.18	.....	2.73

We consider Lacmoid as valueless for these titrations and among the remaining four the preference depends upon the individual, as the color changes in all are distinct and about equally sharp. Dohme inclines to Hæmatoxylin and Engelhardt to Brazil wood, because of practice with their respective color changes.

## REPORT OF LYMAN F. KEBLER.

The directions were carefully adhered to throughout the work, except in the quantity of lacmoid solution employed. It was found that a larger amount of the indicator solution gave better results, consequently from 10 to 15 drops were employed per titration. Iodo-eosin is worthless if applied according to directions. The following method gave fairly good results: Introduce the alkaloidal solution into a glass stoppered cylinder, add enough strong ether to form a supernatant layer about 2.5 cm. deep. If the solution is alcoholic it must be sufficiently diluted to facilitate the formation of this layer. To this mixture add the indicator, an excess of the decinormal acid solution, and agitate the cylinder thoroughly. The excess of acid is carefully retitrated with the centinormal alkali, adding a small quantity of the alkaline solution, agitating, etc. The end reaction is quite sharp, and fairly concordant results can be obtained with some practice and patience. The results obtained below were obtained by this procedure.

The end reactions determined on in last year's work for Brazil wood, hæmatoxylin and cochineal were adhered to in the present work. Rosolic acid, from a pale yellow to a pale purple; lacmoid from wine-red to onion-red; iodo-eosin from a reddish-yellow to a light magenta; tropæolin OO from red to straw-yellow.

The tropæolin OO sent out was worthless. A sample secured by Prof. Caspari, and kindly sent to the chairman, gave fairly satisfactory results. An indicator that cannot be obtained of uniform quality ought not to be considered in accurate volumetric work. Lacmoid and rosolic acid yielded fairly satisfactory results, but all indicators thus far considered must give way to the sensitive and very satisfactory indicators, viz.: hæmatoxylin, Brazil wood and cochineal. These indicators have stood the tests of the committee well, and can always be secured of a uniform quality. A product like methyl-orange cannot be employed with safety for delicate work on account of its varying quality and indistinct end reaction.

The cinchonine was not completely taken into solution by the amount of acid solution prescribed, unless digestion was unduly prolonged on the water bath, consequently it is better to employ more of the acid. Why this is the case the writer is not prepared to say. There was more than enough acid present, by calculation, than was necessary to form the normal sulphate. Subsequent titrations proved this also.

The results obtained for the cinchona alkaloids indicate that either some disturbing agent is present or their relation to acids is not understood.

In extracting the alkaloidal material, a larger quantity of the substances was employed than that prescribed in the directions; that is enough to make a number of estimations from the same extraction. This undoubtedly has a tendency to yield more uniform results. The writer believes that the differences obtained by the several workers lie not only in the indicators, but also in manner and care of extracting the active principles from the various drugs and their preparations.

In comparing the results obtained with  $\frac{N}{100}$  alkaline solution with those obtained with  $\frac{N}{80}$  solution, it was found that the results were practically the same. The  $\frac{N}{80}$  solution gives sharper end reactions, and the writer recommends its use. Below are given the results obtained by the writer:

Indicators.	Number of Cc. of $\frac{N}{100}$ KOH required per 10 Cc. of $H_2SO_4$ .	Number of Cc. of $\frac{N}{100}$ KOH required per 10 Cc. of HCl.	Per cent. of Pure Alkaloids in Material used; Titrated with $\frac{N}{100} H_2SO_4$ .			
			Atropine.	Brucine.	Morphine.	Strychnine.
Brazil wood .....	99.45	99.82	99.76	91.21	98.02	95.52
Cochineal .....	99.86	100.40	99.53	93.63	97.81	95.69
Hæmatoxylin ....	100.00	100.04	99.46	93.96	98.02	95.52
Iodo-eosin .....	98.92	98.90	102.03	94.75	98.92	97.86
Lacmoid .....	98.26	99.74	100.14	95.54	102.02	95.19
Rosolic acid .....	99.46	101.10	101.22	91.99	103.02	95.31
* Tropæolin OO ..	96.86	94.40	....	....	104.53	....
† Tropæolin OO ..	100.12	100.63	99.40	91.99	98.48	98.91

\* Tropæolin OO, sent out by Chairman.

† Tropæolin OO, sent Chairman by Prof. Caspari.

	Per cent of Pure Alkaloid in Material used; Titrated with $\frac{N}{10}$ HCl.					
	Atropine.	Brucine.	Cinchonine.	Morphine.	Quinine.	Strychnine.
Brazil wood.....	99.25	91.18	106.60	97.71	109.99	95.52
Cochineal .....	99.93	92.59	105.68	97.71	109.99	96.73
Hæmatoxylin ....	99.70	91.21	107.89	97.42	109.60	96.52
Iodo-eosin .....	99.70	92.59	....	98.97	....	98.86
Lacmoid .....	99.86	92.54	....	100.59	....	99.00
Rosolic acid .....	99.00	90.22	107.75	100.14	101.97	96.89
Tropæolin OO....	99.45	93.49	109.30	100.34	108.76	99.37

	Per cent. of Alkaloids in Coca Leaves. Gravitric.	Per cent. of Alkaloids in Coca Leaves. Volumetric.	Per cent. of Alkaloids in Fl. Ext. of Coca Leaves. Gravitric.	Per cent. of Alkaloids in Fl. Ext. of Coca Leaves. Volumetric.
Brazil wood.....	0.88	0.686	0.528	0.35
Cochineal .....	0.86	0.698	0.55	0.40
Hæmatoxylin ....	0.889	0.69	0.54	0.38
Iodo-eosin .....	0.93	...	0.50	...
Lacmoid .....	0.92	0.678	0.50	0.35
Rosolic acid .....	0.87	....	0.54	0.36
* Tropæolin OO..	0.91	....	0.52	...

	Per cent. of Alkaloids in Nux Vomica. Gravitric.	Per cent. of Alkaloids in Nux Vomica. Volumetric. Process "A."	Per cent. of Alkaloids in Nux Vomica. Volumetric. Process "B."
Brazil wood.....	2.89	2.47	2.47
Cochineal .....	2.92	2.63	2.55
Hæmatoxylin ....	2.88	2.44	2.40
Iodo-eosin .....	2.82	...	...
Lacmoid .....	2.90	2.77	2.66
Rosolic acid .....	2.80	2.33	2.32
* Tropæolin OO..	2.94	3.00	2.82

\* Tropæolin OO, sent out by Chairman.

#### REMARKS BY THE CHAIRMAN.

In comparing the results obtained by the different workers, as tabulated below, the fact must be borne in mind that variations are in part due to deviations from the chairman's directions as specified in the report of Messrs. Base and Caspari.



TABULATED RESULTS OF THE WORKERS.

Indicators.	Number of Cc. of $\frac{N}{10}$ KOH required per Cc. of $\frac{N}{10}$ $H_2SO_4$ .						Number of Cc. of $\frac{N}{10}$ KOH required per 10 Cc. of $\frac{N}{10}$ HCl.						Per cent. of pure Quinine in sample examined. Titrated with $\frac{N}{10}$ HCl.					
	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.
Brazil Wood.....	99.70	97.87	97.89	.....	.....	99.45	99.70	97.82	97.83	.....	.....	99.82	109.02	.....	.....	.....	.....	.....
Cochineal.....	99.70	97.97	98.00	.....	.....	99.85	99.60	98.01	98.03	.....	.....	100.40	109.28	.....	.....	.....	.....	.....
Hæmatoxylin.....	99.70	97.89	98.04	.....	.....	100.00	99.80	98.20	98.12	.....	.....	100.04	109.28	.....	.....	.....	.....	.....
Iodo-eosin.....	99.70	97.44	97.51	.....	.....	98.92	.....	97.55	97.31	.....	.....	98.90	.....	.....	.....	.....	.....	.....
Lacmoid.....	99.87	98.17	98.24	.....	.....	98.26	99.70	98.55	98.63	.....	.....	99.74	.....	.....	.....	.....	.....	.....
Rosolic Acid.....	.....	.....	.....	.....	.....	99.46	.....	.....	.....	.....	.....	101.10	.....	.....	.....	.....	.....	.....
Tropæolin OO.....	.....	97.86	97.87	.....	.....	96.86	.....	97.90	97.85	.....	.....	94.40	.....	.....	.....	.....	.....	.....

Indicators.	Per cent. of pure Cinchonine in sample examined. Titrated with $\frac{N}{10}$ HCl.					Per cent. of pure Atropine in sample examined. Titrated with $\frac{N}{10}$ H <sub>2</sub> SO <sub>4</sub> .					Per cent. of pure Brucine in sample examined. Titrated with $\frac{N}{10}$ H <sub>2</sub> SO <sub>4</sub> .							
	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.
Brazil wood.	111.52			121.8	94.0	106.6	99.82	99.80	99.75	99.86	100.0	99.76	92.53	93.50	93.19	94.2	95.9	91.21
Cochineal ...	111.52	107.5 to 117		122.4	99.8	105.68	98.87	100.00	100.00	100.00	100.0	99.53	92.92	94.43	94.17	94.8	97.3	93.63
Hæmatoxylin	111.68			122.7	94.8	107.89	98.86	99.99	99.89	99.43	100.0	99.10	92.55	93.30	93.84	93.6	96.1	93.96
Iodo-eosin		107.5 to 117										102.03						94.75
Lacmoid				126.0	101.6		99.13	100.28	100.39	100.7	100.8	100.14	92.79	93.78	93.84	95.3	97.3	95.54
Rosolic Acid.							99.75					101.22						91.99
Tropæolin OO				123.3	101.4	109.30		99.99	100.02	101.15		99.44		91.70	91.62	94.8	97.0	92.59

Indicators.	Per cent. of pure Morphine in sample examined. Titrated with $\frac{N}{10}$ $H_2SO_4$ .						Per cent. of pure Strychnine in sample examined. Titrated with $\frac{N}{10}$ $H_2SO_4$ .						Per cent. of alkaloids in powdered Nux Vomica. Direct titration.					
	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.
Brazil Wood...	97.08	98.35	98.32	98.80	98.75	98.02	95.66	96.75	96.53	96.57	99.6	95.52	2.28	2.44	2.48	2.09	2.14	2.47
Cochineal...	97.66	98.66	98.58	100.18	99.3	97.81	96.07	97.64	97.43	97.46	99.9	95.60	2.55	2.57	2.76	2.75	2.63	2.63
Hæmatoxylin.	97.18	98.60	98.46	98.5	99.0	98.02	95.55	97.08	97.03	95.65	99.3	95.52	2.37	2.43	2.43	2.58	2.44	2.44
Iodo-eosin...	97.61	98.99	98.91	99.26	99.2	102.02	96.14	98.00	98.03	97.46	94.3	95.19	2.59	2.64	2.56	2.73	2.77	2.77
Lacmoid	97.61	98.99	98.91	99.26	99.2	102.02	96.14	98.00	98.03	97.46	94.3	95.19	2.59	2.64	2.56	2.73	2.77	2.77
Rosolic Acid.	98.93	98.55	99.43	99.43	99.43	103.02	96.97	97.19	96.86	97.0	98.91	95.31	2.60	2.58	3.15	3.01	3.06	3.06
Tropæolin OO	98.93	98.55	99.43	99.43	99.43	103.02	96.97	97.19	96.86	97.0	98.91	95.31	2.60	2.58	3.15	3.01	3.06	3.06

Indicators.	Per cent. of alkaloids in powdered Nux Vomica. Gravi-metric.						Per cent. of alkaloids in powdered Nux Vomica. Volumetric after gravi-metric.						Per cent. of alkaloids in powdered Coca Leaves. Gravi-metric.					
	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.
Brazil Wood.....	2.64	2.76	2.76	2.88	.....	2.89	2.30	2.32	2.31	2.07	.....	2.47	1.09	1.05	1.05	.....	0.88	0.88
Cochineal.....	2.73	2.76	2.76	3.30	.....	2.92	2.36	2.37	2.37	2.18	.....	2.55	0.99	1.05	1.05	.....	0.86	0.86
Hæmatoxylin.....	2.87	2.76	2.76	3.17	.....	2.88	2.45	2.34	2.36	2.06	.....	2.40	1.18	1.05	1.05	.....	0.89	0.89
Iodo-eosin.....	.....	2.76	2.76	.....	.....	2.82	.....	2.36	2.36	2.06	.....	.....	.....	1.05	1.05	.....	0.93	0.93
Lacmoid.....	2.78	2.76	2.76	3.26	.....	2.90	2.48	2.39	2.38	2.18	.....	2.66	0.93	1.05	1.05	.....	0.92	0.92
Rosolic Acid.....	.....	2.76	2.76	.....	.....	2.80	.....	.....	.....	2.21	.....	2.42	.....	1.05	1.05	.....	0.87	0.87
Tropæolin OO.....	.....	2.76	2.76	3.12	.....	2.94	.....	2.36	2.37	.....	.....	2.82	.....	1.05	1.05	.....	0.91	0.91

\* Percentage based on volume; specific gravity 0.9392.

† One determination.

## TABULATED RESULTS OF THE WORKERS.—CONTINUED.

Indicators.	Per cent. of alkaloids in powd. Coca leaves. Volumetric after gravimetric.						Per cent. of alkaloids in Fl. Ext. of Coca leaves. Gravimetric.						Per cent. of alkaloids in Fl. Ext. of Coca leaves. Volumetric after gravimetric.					
	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.	Lloyd.	Base.	Caspari.	Engelhardt.	Dohme.	Kebler.
Brazil wood ..	0.70	0.89	0.88	0.47	0.68	0.68	0.48	*0.47	*0.47	0.28	0.43	0.53	0.34	*0.44	*0.43	0.26	0.26	0.35
Cochineal ..	0.78	0.92	0.91	0.46	0.69	0.69	0.57	0.47	0.47	0.25	0.43	0.55	0.29	0.45	0.45	0.25	0.32	0.40
Hæmatoxylin ..	0.75	0.91	0.92	0.43	0.69	0.69	0.53	0.47	0.47	0.30	0.45	0.54	0.27	0.45	0.45	0.27	0.24	0.38
Iodo-eosin ..	.....	.....	.....	.....	.....	.....	.....	0.47	0.47	.....	.....	0.50	.....	.....	.....	.....	.....	.....
Lacmoid ..	0.67	0.94	0.92	0.35	0.68	0.68	0.60	0.47	0.47	0.37	0.47	0.50	0.35	0.45	0.45	0.22	0.26	0.35
Tropæolin OO ..	0.93	0.93	.....	.....	.....	.....	.....	0.47	0.47	.....	.....	0.52	.....	0.46	0.45	0.18	0.21	.....

\* Percentage based on volume; specific gravity, 0.9392.

† One determination.

## CONCLUSIONS.

1. Hæmatoxylin is the indicator *par excellence* for titrating alkaloids. Brazil wood and cochineal compare favorably with hæmatoxylin, but are not as reliable in some cases; nor do they appear to be quite as sensitive.

2. Pure alkaloidal material can be titrated with satisfactory results, excepting the cinchona alkaloids. Such anomalous results were obtained with these alkaloids that we are inclined to think that the nature of the salts of these alkaloids is not fully understood.

3. The estimation of alkaloids by means of volumetric solutions can best be carried out in laboratories where daily determinations are made, but also quite well and sufficiently accurately in any laboratory containing the necessary apparatus.

4. The gravimetric results based on process "B" are fairly satisfactory, and it is with this process that the average worker will obtain the most concordant results. While the volumetric process yields good results in the hands of careful workers and under favorable conditions, yet we feel convinced that some practice and experience are necessary to yield good results in the hands of the average pharmacist.

LYMAN F. KEBLER, *Chairman*,  
ALFRED R. L. DOHME,  
CHAS. CASPARI, JR.

It was moved by Mr. Mayo that the report be received and take the usual course:

THE CHAIRMAN: I understand that a member of this Committee desires to make a short explanation, so I shall ask for that before we do anything with the report.

MR. CASPARI: Mr. Chairman and Gentlemen: The deviations from the directions of the Chairman of this committee made by Dr. Base, of Baltimore, and myself, I think call for a little explanation, in order to enable you to better understand the difference in the results as tabulated on the chart. The use of calibrated apparatus may have been adopted also by other members, but the standardization of the acids is a matter of so much difference between the Chairman and myself, that I think it calls for remarks, so that the gentlemen present who are familiar with the methods may give us their opinion.

In the first place the Chairman directed that the weight of absolute acid present in a *given weight* of diluted acid should be determined, and that from the data thus obtained the quantity of water necessary to convert the diluted acid into seminormal or decinormal acid should be calculated. I am not aware whether other members of the Committee followed these directions, but as volumetric analysis is based on the proportion of reagent

present in a fixed volume, we took the liberty of following the usual plan of determining the weight of absolute acid in a *given volume* of diluted acid, and then made our calculations. Furthermore, we standardized our sulphuric acid by precipitation as barium sulphate, instead of neutralization with ammonia (Weinig's method) as recommended by the Chairman. The reason for this step was that in a series of 8 or 10 determinations by Weinig's method we failed to get concordant results, while in a series of 7 determinations with barium chloride the results agreed to within the third decimal. Having prepared our decinormal acids we standardized our alkali solution against these, using phenolphthalein as indicator, which, although requiring a slight excess of alkali when neutralizing an acid liquid with alkali for the characteristic end-reaction, was considered equally suitable, particularly as it was necessary to find the equivalent or ratio between the acid and alkali for each indicator for use in the subsequent work. It makes no difference whether the alkali solution is exactly centinormal or not, as long as its true acid value has been accurately established for each indicator.

Two other deviations should be mentioned, as they undoubtedly had a direct bearing on the final results. Both are mentioned in the report submitted to the Chairman by Dr. Base and myself, namely the use of a *given volume* instead of a *given weight* of fluid extract of coca in the assay of that preparation, and secondly, the titration of all alkaloids and alkaloidal residues in acid aqueous solution only, avoiding the presence of alcohol.

Mr. Mayo's motion to receive and refer the report having been duly seconded, was then submitted to the meeting and carried.

MR. LLOYD: Permit me to call attention to a modification of the usual method of testing the acidity or alkalinity of dilute liquids by means of litmus paper. Instead of using a glass rod, and dipping the paper into the liquid, use a capillary glass tube of not too small a bore. Having dipped the tube into the liquid, place its tip on the piece of paper and allow the liquid to diffuse itself by absorption; the result will be that the water will separate from the contained acid or alkali, leaving it concentrated at the point of the tube, changing the contact point of the paper markedly red or blue, in accordance with the nature of the liquid. This is in accordance with the rule reported by me some years ago, in which it was shown that fibrous paper had the property of separating solutions.

It may be added that the application of this very sensitive method to the testing of liquids must be credited to Dr. Waldbott, who, so far as I know, first employed it.

MR. SCOVILLE: There is one conclusion that the Committee arrived at that I do not quite understand, namely, that in the hands of the average pharmacist, the volumetric method is hardly satisfactory. In our school during the past year I have had the senior class make extracts of nux vomica, and assay it by the volumetric method, supplementing that by the gravimetric assay. It was noticeable that the two assays agreed quite closely, the gravimetric giving slightly higher results in almost every instance. The agreement in the two methods showed that in the hands of these men the volumetric assay gave quite as good results as the gravimetric, and therefore would be just as reliable. This was done by a class of about twenty-five men in the senior course. They took the nux vomica, made an extract, and then standardized it. Instead of using the solution of Brazil wood I had them take the dry Brazil wood, and put distilled water to it and boil it for a moment, so that there could be no difference in the solution of Brazil wood when standardized. Now, compare the gravimetric and volumetric analysis, once in a while a man would get it somewhat lower by the volumetric; but as a general thing, taking a 15 per cent. or 18 per cent extract, it was within a few per cent. of being slightly higher by the gravimetric.

There is another point which came up last year and which I have never seen mentioned anywhere, concerning *nux vomica*. Just about Christmas time there was a cold spell, and there were several members of the class who started their extracts about that time. The temperature of the room was about 20° F. There was no heat in the building. They did their percolation during that spell, and the percolate obtained was very light in color and less oily than usual. Upon evaporating to get the solid extract we also had a light extract, and one that appeared to be less oily than that obtained at a normal temperature, nor did it cake together. It was found that these extracts were stronger in alkaloids and freer from extraneous matter. It was a surprise to us, and of course after the cold spell was over we could not go over it again. The menstruum appeared to reject extraneous matter and oily matter, and yet took out the alkaloids; and while some of the class got an extract which assayed at first at 16 per cent. or 17 per cent., there were two or three that got an assay of 21 to 22 per cent. It was an interesting fact, and one that will bear investigation.

DR. RUSBY: I would like to inquire if any of these workers have found any difference in the character of the Brazil wood they have used. There is no doubt there are different varieties. I have worked very hard in tracing these to their origin, and I have been interested in knowing whether the indicator is prepared from both of these, or which one it is prepared from.

MR. KEBLER: I do not know what Brazil wood it was, but I secured it in the house I am connected with, and it proved to be very good. Dr. Rice showed me a sample, and I agreed with him it was Brazil wood; still I could not ascertain what Brazil wood it was, and I communicated with consuls in different localities to find where that Brazil wood came from, and on my recent trip south I made inquiries, but could not ascertain.

MR. PRESCOTT: With respect to the estimation of the cinchona alkaloids, it seems to me that the variability of the results ought not to surprise us from what we know now of the constitution of these alkaloids, or, rather, of their combining power. No other alkaloid that has been worked will form acid salts with anything like the readiness that cinchona alkaloids do. Almost the same conditions exist which we had to labor against for so many years in the volumetric estimation of phosphoric acid with the use of different indicators. It will be remembered that fifteen years ago it was considered impossible to estimate phosphoric acid volumetrically with indicators at all, but by careful work with different indicators that difficulty has been measurably overcome, and perhaps it may be overcome with reference to cinchona alkaloids.

MR. FENNEL: With reference to what has been said about the results obtained by the volumetric and gravimetric methods, I would say that in my experience these results do not agree so closely. I find frequently the results obtained by titration are not much more than one-half the result obtained by the gravimetric method. I would like to hear what Mr. Caspari has to say as to his experience.

MR. CASPARI: While I cannot recall such great differences between gravimetric and volumetric results as those just mentioned, there can be no doubt whatever that in the case of many alkaloidal drugs the gravimetric results are, as a rule, too high. This difficulty has, however, of late years been measurably overcome by treating the varnish-like chloroformic residue two or three times with ether, so as to get rid of the chloroform tenaciously held by the residue. When this plan is followed, together with careful work in general, the gravimetric results approach the volumetric results much more closely.

The report of the Committee on the Revision of the United States

Pharmacopœia was presented by Dr. Bartley, in the absence of the chairman, Mr. Eliel.

# REPORT OF THE COMMITTEE ON THE REVISION OF THE PHARMACOPŒIA.

*To the President, Officers and Members of the American Pharmaceutical Association :*

Your Committee on the Revision of the United States Pharmacopœia respectfully submit the following :

1. *Oleum Anisi* : Since Anethol, a definite chemical compound, is conceded to be the active principle of the oil, it should either be substituted for the oil or a certain percentage of anethol should be required, and the oil should be valued by its content of anethol. Further, a method of determining the content of anethol should be devised.

2. *Oleum Cinnamomi* : Cinnamic aldehyde is the active principle of this oil, and should either be substituted for it or a standard requirement and method of assay for cinnamic aldehyde agreed upon.

3. *Oleum Gaultheriæ* : Methyl salicylate is the active principle of this oil, and should be substituted in the Pharmacopœia, as the synthetic methyl salicylate is being generally used in place of the natural oil, and is better than the latter, as it is a pure and uniform product, and not a complex mixture of varying composition.

4. *Oleum Limonis* : Citral gives this oil its value, and should either be substituted for it, or a citral requirement and method of assay be set up.

*Oleum Betulæ Volatile* should be dropped, since it is practically identical with and has been practically superseded by methyl salicylate.

5. *Oleum Bergamottæ* : Linalool gives this oil its characteristic odor, and a linalool standard requirement would be useful to determine the value of the oil.

6. *Oleum Myrciæ* : The pure oil distilled from bay leaves (*Myrcia Acris*) does not meet the United States Pharmacopœia requirement of specific gravity and solubility, and manufacturers of this oil are compelled to adulterate the same with Eugenol to make their *Ol. Myrciæ* actually a United States Pharmacopœia article, while they sell the pure oil of bay under their own name, and naturally at higher prices, making the United States Pharmacopœia article an inferior article. The requirement should be so altered that pure oil of bay can be labeled United States Pharmacopœia, as it should be.

7. *Oleum Sassafras* : If Safrol is the odoriferous principle of this oil, it should be substituted for it, or a Safrol requirement and method of assay established.

8. *Hyoscine Hydrobromate* : It has been maintained that scopolamine is identical with hyoscine, and some manufacturers have substituted the name scopolamine hydrobromate for hyoscine hydrobromate. In order to avoid confusion and possible danger, it is desirable to have this matter investigated and decided by the committee.

9. *Physostigma* : The active principle is physostigmine, an alkaloid. As this drug is used quite extensively, it is desirable to devise a method of assay and establish a standard requirement for the drug.

10. *Codeinæ Sulphas* and *Codeinæ Phosphas* should be made official, as they are being very generally used, and their use is increasing at a steady rate.

11. *Cola Acuminata*, *Kola nut*, is being used to such a large extent now, and is a valuable drug, inasmuch as it contains considerable caffeine, a valuable remedy, that it appears desirable to make it official, and establish a caffeine requirement and method of assay.

12. *Extractum Senegæ Fluidum* and *Extractum Scillæ Fluidum* : Acetic Extracts of these are desirable, and investigation as to best process requested. The object for this desired investigation is for the purpose of changing the present formula for *Syr. Scillæ Compos.* which is not satisfactory.

13. *Saw Palmetto Berries*: *Sabal Serrulata* is being used in large quantities now, and the use appears to be steadily increasing. It would be well to make it official, since it appears to possess therapeutic value.

14. *Adeps Benzoïnatus*: The U. S. Pharmacopœia directs that white wax be added during the summer months. This should be changed to Stearic Acid.

15. *Spiritus Frumenti* and *Spiritus Vini Gallici* should be dismissed from the Pharmacopœia.

16. *Vinum Album* and *Vinum Rubrum* should be dismissed from the U. S. Pharmacopœia.

The medicated wines of the Pharmacopœia should be dismissed and replaced by vinegars.

17. Dismiss all *Tinctures* having a *Fluid Extract* of the same drug official, and all *Fluid Extracts* having a *Tincture* of the same drug official; substitute for such *Tinctures* and *Fluid Extracts* a *50 per cent. Tincture* under a *distinctive title*.

18. *Tinctura Opii Deodorati*: The process of the U. S. Pharmacopœia is both wasteful and tedious. The following modification is suggested:

Granulated Opium.....	100 gm.
Deodorized Gasoline 87°.....	q. s.
Alcohol.....	200 Cc.
Water.....	A sufficient quantity.

Macerate the opium with 400 Cc. gasoline for twenty-four hours, shaking occasionally, decant and add 200 Cc. more gasoline, and macerate twenty-four hours longer, shaking occasionally. Then transfer to a filter, and when liquid has ceased dropping add 200 Cc. gasoline, and when all has passed through filter, dry the opium, using a gentle heat if necessary. Macerate the opium in 300 Cc. warm water for twenty-four hours, transfer to a percolator, when liquid has ceased to drop add warm water to obtain 800 Cc. To this add the alcohol, and filter. Sample of deo. tincture of opium (not assayed) hereby submitted.

19. *Linum*, *Sinapis Alba*, *Sinapis Nigra*, entirely free from other seeds, are difficult to obtain in the market, and the standard should be changed, giving a maximum percentage of foreign matter allowed.

20. Powdered *Acacia* and *Camelgia* are frequently met with showing traces of starch, such contamination being caused either through presence of small quantities of foreign matter in the crude substance, or through unintentional adhesion of such matter in the mills where ground. A change should be made in their standard, limiting amount allowable.

21. It is stated that *Cane sugar syrup*, especially many of the medicinal syrups, gradually undergo inversion on standing, and that these syrups will in many cases disturb the digestion of those who are obliged to take them for any length of time. We recommend investigation of this subject, as well as of the utility of using glycerin in place of cane sugar syrup.

22. *Pulvis Ipecac et Opii*: There has been some complaint that the formula of 1890 does not yield the same therapeutic effect as that of 1870, and many pharmacists are obliged to use both formulæ on that account. Investigation is suggested.

23. *Tinctura Nucis Vomica*: The formula of 1890 is not satisfactory; the tincture deposits extractive matter, and does not yield the clear product of the formula of 1880, nor does it otherwise present any advantage. We suggest a return to the formula of 1880, retaining the required standard of content of alkaloids of present formula.

24. *Tinctura Catechu Composita*: This tincture should either be made by maceration,

or the substances used for making same should first be mixed with some porous insoluble substance to facilitate percolation.

LEO ELIEL,  
W. M. SEARBY,  
ALFRED R. L. DOHME,  
ELIAS H. BARTLEY,  
A. B. STEVENS.

After some discussion by Messrs. Hallberg, Remington and Caspari, it was decided to postpone consideration of the report to the next session, when it should come up as the first order of business.

Mr. Prescott, chairman of the Special Committee on Scientific Research, then read the report of that committee as follows :

#### REPORT OF THE SPECIAL COMMITTEE OF RESEARCH.

##### *To the Section on Scientific Papers :*

At the last meeting of this Association there was instituted, within the Scientific Section, a Special Committee of Research, to have charge of any special investigation, within the province of the Section, which, in their discretion, would be benefited by the aid such a committee could give with the facilities placed at its disposal. It was recommended that this Committee shall receive such encouragement financially as is necessary to advance this work, subject to the approval of the Council, under the condition of the treasury. (See Proceedings for 1895, pages 235, 193 and 184.)

The Committee was to consist of three members (subsequently made four members) by appointment from the Association, and two members *ex-officio*, namely, the Chairman of the Section and the Chairman of the Committee of Revision of the United States Pharmacopœia.

The Chairman of the Scientific Section, when this action was taken, was charged with the appointment of the Committee, and entered upon its organization in October. On December 18, 1895, the Committee was constituted of Edward Kremers, John U. Lloyd and Lucius E. Sayre, with Albert B. Prescott as Chairman, Dr. Rice and Prof. Sadtler being the *ex-officio* members. Prof. Lloyd was added to the Committee for the special service of presenting the pharmaceutical history of such drugs as should be adopted for investigation.

In the course of the organization of the committee it was agreed to undertake the supply of original literature, from libraries, to meet the needs of investigators. In order to extend the bounds of knowledge, every investigator faces the task of first finding what these boundaries are. It is a task of library search for original articles scattered over many years and through different languages, and a task of making reference lists, copies, abstracts, and sometimes translations, with such exactness and discrimination as would be possible to one having a lively appreciation of the scope of the research in hand. It was hoped that the employment of a skilled reference-reader, directed by the chairman of the committee, if he were provided with clerical help for consultation with investigators by mail, might serve the end in view. It was also recognized as being most desirable that, for some investigations, the service of a trained assistant should be provided.

Therefore, the needs of financial aid in this committee are mainly these: (1) for the service of a reference-reader and library clerk; (2) for postage and stationery; (3) prospectively for assistance in research.

In November the Council adopted a motion to appropriate a sum of money, not to exceed one hundred and fifty dollars, for the use of the committee.

It was from the first the intent of the committee to favor the needs of the revision of

the Pharmacopœia, and to this end the Chairman of the Committee of Revision is made a committeeman *ex-officio*. On December 22, 1895, Dr. Charles Rice responded to the request of the committee in a systematic statement of certain leading features of the work most needed for the revision. An outline of this schedule will be given later in this report. In reply to the inquiry, whether the Committee of Revision could appropriate money for the work of this committee (as already defined), the Committee of Revision, under their Circular 278, by vote provided a co-organization with this committee, to constitute Section II of their Research Committee D, whereby, in accord with their rules, "the Finance Committee (of the Committee of Revision) have authority to grant, from time to time, the necessary funds required . . . in the prosecution of their researches." This co-organization, necessary under good business rules, to enable the Committee of Revision to have authority over the expenditure of their own appropriations, is not for direction in the experimental work; and this committee remains one distinctly of the American Pharmaceutical Association, as Chairman Rice expressly states in his letter of December 29, 1895.

It was from the first the design of this Committee to join the hands and concentrate the efforts of different and distant experimenters upon the same research. To extend this co-ordination of scientific labor, a letter of invitation was sent to a considerable number of those members of the Association who are engaged more or less in investigating, offering the services of the Committee, including the supply of literature, and inviting co-operation with the committee upon any subjects to be especially benefited by it.

The research subjects which the Committee have taken in hand have been chiefly as follows:

1. Taraxacin.—By L. E. Sayre.
2. The Menthol-group. Report IV.—By Edward Kremers.
3. *Monarda fistulosa*.—By Edward Kremers.
4. *Monarda punctata*.—By Edward Kremers.
5. *Cascara Sagrada*—its chemistry and pharmacognosy undertaken, by Dr. A. R. L. Dohme and others, with a pharmaceutical history by Prof. Lloyd. This history is now presented. A preliminary report by Dr. Dohme is before the Committee, but he desires to do further work before offering anything for publication. It is hoped that Prof. Trimble will take up the tannins of *Cascara*.
6. The Caffeine Compound in Kola, already styled "Kolanin," its chemistry and its relations to the caffeine bearing compounds of the other beverage-plants. A. B. Prescott, and J. W. T. Knox.
7. For future work, the Periodides of the Alkaloids, as Molecular Forms for Volumetric or Gravimetric Estimation. By A. B. Prescott and others, in certain fundamental investigations already published in the chemical journals in 1895-96. and collected in a pharmaceutical reprint, preparatory to work for assay methods, now being undertaken in behalf of the Revision of the Pharmacopœia.
8. Valuation of Wild Cherry Bark,—going on to an investigation of amygdalin and related glucosides and their reactions in estimation. A. B. Stevens.

There have been before the Committee projects for the concentration of several workers upon the chemistry and pharmacognosy of each of several important drugs. It is designed to give preference to indigenous drugs, also to drugs which, though not indigenous, are largely produced in this country.

The work for the Pharmacopœia, already referred to, has been defined by Chairman Rice as follows:

"1. Determination of the relative value of various selected alkaloidal assay-methods, by applying them to known alkaloids both in a pure state and also in their natural condition in the original plants as well as to artificial mixtures containing them. (In the final choice of a process, to be recommended for any particular drug, that one



will probably be deemed to deserve preference which gives the most uniform results under all possible conditions.)

"2. Determination of the best method of valuation of drugs like the following :

Aconite,	Veratrum viride, etc.,
Ergot,	Rhubarb,
Digitalis,	Senega, etc.

"3. Nux Vomica. Determination of Strychnine from Brucine.

"4. Determination of the principles in the various *Strophanthus* seeds of the market, their nature, quantity; also a method of valuation or assay.

"5. Is it not feasible to set upper and lower limits of active constituents, or either of them where this is sufficient, in the case of the more important crude drugs from which fluid extracts or tinctures are prepared and which can be readily assayed? If such limits are to be set, what would be the proper figures for drugs like the following :

Aconite,	Conium,	Colchicum,
Belladonna,	Hyoscyamus,	Ipecac,
Coca,	Pilocarpus,	Stramonium, etc."

In respect to "the valuation of crude drugs and preparations made therefrom," Chairman Rice says, "this involves not only the choice of the best method of valuation in the case of drugs whose constituents are already known, but also the discovery and isolation of the real active principles in the case of drugs whose constituents are not so well known (as ergot), or at least the discovery of some reliable method of valuation of one or more constituents (though not themselves at all, or solely, the active principles) which may be found, in practice, to serve as a measure of the value (as, for instance, certain resinous constituents in *Cannabis indica*).

It is set before the committee to undertake, as far as may be, such researches as promise permanent value in science. Such will give the best credit to the Association in all parts of the world.

Preparatory to the supply of original literature, all the members of the committee, and the volunteer workers with it, have been furnished with a selected library-list of the full sets of the chief chemical, botanical, pharmacological, pharmaceutical, medical and other scientific periodicals, as well as certain encyclopædic works of reference. The bibliographies so far furnished have been as follows:

*Taraxacum*—A full bibliography, with transcripts or translations of the originals of the earlier and more remote papers.

*Cascara Sagrada*—A full bibliography, with quite extensive transcripts of certain foreign chemical papers, only brief abstracts of which are easily accessible.

*Solanine*—A bibliography.

*Compounds of Bismuth with Organic Bases*—A bibliography from 1890.

Certain Italian literature upon olive oil.

From the first two of these bibliographies, the literary research required a great deal of time. All the bibliography has been duplicated, to leave a retained copy in the hands of the Chairman for consultation during successive inquiries. These bibliographies will be available for publication with the researches on their completion.

It has been agreed in this committee that papers from the committee when published should be simply credited as from the Research Committee, leaving without change the usual terms of individual authorship, and the separate responsibility of the individual author. Therefore the author will give acknowledgment if he has received any aid from the committee, in the way of library facilities, consultation upon the conduct of experimentation, etc., etc. The papers are to go to the Scientific Section, like other papers, subject to the same rules in respect to presentation and publication, but always subject to

call from the Committee of Revision of the Pharmacopoeia, who are to be supplied with an early copy of all papers of direct bearing upon Revision. Any member of the Committee of Research may present a paper as from the Committee, upon his sole responsibility, if he will notify the Chairman; but papers from volunteer workers must be examined and approved by the committee, or by some member of it who will undertake this responsibility.

The chairman accepted the duty upon this committee with some hesitation, and was led to do so by his interest in making a stated provision of original literature to workers in research. This is perhaps the more distinctive function of this committee. But in the opinion of men who have had the plan of the committee longer under consideration, its more important function is the concentration and co-ordination of certain scientific work, in a more special way than the Committee on Scientific Papers, with the entire Section upon their hands, can be expected to do. At any rate, it is still a function for such a special committee as this to devote whatever means the frugal surplus of the Association can spare, and means that can be otherwise secured, to the promotion of effective research, beyond the supply of literature, in the employ of trained experts upon special questions, at any post in this country, or in the world, wherever the work can be done with the best promise.

In regard to co-organization with the Committee of Revision of the Pharmacopoeia, it is a feature not important, but one attended with decided advantages, and that does not appear open to any objection.

It is manifest that the best service of such a committee as this will be found by adaptation to pharmaceutical demands as experience shall be gained.

Finally, we beg leave to recommend that this sub-committee, the Special Committee on Research, as created by the Section of Scientific Papers, August 17, 1895, be elected annually by the Section, in order of business to follow next after the election of the Standing Committee of the Section, the Committee on Scientific Papers.

SAML. P. SADTLER,  
EDWARD KREMLER,  
J. U. LLOYD,  
L. E. SAYRE,  
ALBERT B. PRESCOTT.

It was moved by Mr. Main and duly seconded that the report be received, and that the recommendations made therein be adopted.

DR. BARTLEY: I should like to amend the motion just made. There is nobody who appreciates the value of this Committee more than I do, and I foresee one of the difficulties that will be thrown in the way of the Committee if we simply dismiss it with this idea of re-electing the Committee annually. It seems to me a Committee of this kind should be made a continuous committee as much as possible, and with that idea, I suggest that we change only one or two members of that committee each year, so as to allow the committee itself, in the main, to be perpetual, so that their work will not be cut off every year, and a set of officers have to begin, and get into the work of the committee anew each year. I should like to recommend in that respect to have only one or two members of the committee elected each year, and one for perhaps three years, or one each year for three years.

MR. PRESCOTT: I would suggest that two be elected each year for two years; the committee considers that some such measure should be adopted.

It was moved by Mr. Alpers to amend the motion of Mr. Main so that

the Chair appoint a committee of three to take this matter into consideration, and report at our next session upon a plan for the organization of this committee.

The motion of Mr. Main, as amended by Mr. Alpers, was agreed to, and the Chairman appointed as the committee Messrs. Prescott, Thompson and Bartley.

The subject of requesting financial aid for this committee and its co-workers at the hands of the Committee of Revision and Publication of the United States Pharmacopœia having been brought up, it was finally, after somewhat lengthy discussion by Messrs. Ebert, Remington, Hallberg, Thompson, Sayre and Sheppard, abandoned.

The nomination of officers of the Section for the ensuing year was next proceeded with, Wm. C. Alpers being nominated for Chairman by Mr. Morrison, and Messrs. Coblenz and Scoville for Secretary by Messrs. Whelpley and Fennel, respectively.

The meeting of the Section then adjourned until 8 : 30 p. m.

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#### SECOND SESSION—FRIDAY, AUGUST 14, 1896.

The meeting was called to order at 8 : 30 p. m. by Chairman Sadtler. The minutes of the first session having been read by the Secretary, were, on motion, adopted.

THE CHAIRMAN: The next thing is the election of officers for next year, and I believe it is still in order to make new nominations. Are there any other nominations to be made?

Dr. Whelpley moved that the nominations be closed and that the vote of the Section be cast by the Chairman for Wm. C. Alpers as Chairman for 1897.

Motion was seconded and carried.

THE CHAIRMAN: The vote, as authorized by the Section, has been cast, and, therefore, I declare that Wm. C. Alpers has been nominated and elected as Chairman of the Scientific Section for next year.

Mr. Scoville asked permission to withdraw his name as a candidate for the secretaryship of the Section, but Mr. Fennel objecting, the Chair appointed Mr. Kebler and Dr. Whelpley as tellers.

The ballot being taken, Mr. Coblenz was declared to be elected.

Mr. Scoville moved that the election of Mr. Coblenz be declared unanimous.

Motion was seconded and carried.

In accordance with a motion passed at the first session, the Report of the Committee on Revision of the Pharmacopœia was taken up for discussion. It having been agreed upon motion of Mr. Hallberg that the

reading of the report be continued until some member desired to speak on any subject mentioned, Dr. Bartley read the first seven sections referring to essential oils. (See page 126).

MR. FENNEL: Mr. Chairman, I would like to ask why this committee did not take up the oil of cloves. Eugenol is just as important a constituent in the same ratio as these other constituents are considered primary in these oils. Now, the only thing we can get is a criterion for the boiling point, the index refraction and color reaction. If these other substances are to be put in as taking the place of the oils, then I move that they be discarded altogether.

MR. CASPARI: I think we have with us to-night a gentleman who is probably better prepared than any one else to speak about this matter of essential oils, and I trust that he will give this meeting the benefit of his experience. The subject of the essential oils and the investigation of them is one with which very few of us are very familiar. There has been so much work done in that line during the past ten years, which has been recorded in the various journals, that it has really unsettled all our former views regarding essential oils; and if Dr. Kremers would give us his views on the subject I think he would enlighten us all very much, and I trust he will not deny us the benefit of the information which he has.

DR. KREMERS: It is a comparatively easy matter for any one person or for a number of persons to take out half a dozen or more oils from the Pharmacopœia, and make suggestions with regard to them. A number of these suggestions may easily be considered as important, whereas others may be considered as of questionable value. If I were to make any suggestions with regard to this part of the report of the Committee, I would like to make one something to this point: that, wherever possible, methods of assay be devised for the essential constituents of volatile oils, and wherever desirable, certain constituents that are tending to take the place of volatile oils in the market be added to the Pharmacopœia in addition to the volatile oils at present therein contained. There is at present being conducted work for the U. S. Pharmacopœia Research Committee along this line. One report has already been made to this committee, and I think this report clearly shows what can be done in the way of the valuation of volatile oils. It has been suggested that the methods of assay that can be devised with our present knowledge of the chemistry of volatile oils are too complex for the average pharmacist. If this is the case, the methods of assay at present contained in the Pharmacopœia for opium and cinchona are certainly much more complex than some devised for the assay of one or more of the essential constituents of volatile oils. The average pharmacist will not make an assay of cinchona or opium any more than he will of an essential oil, nevertheless, the method of assay is added to the Pharmacopœia under cinchona and opium; and I think it is advisable, wherever it can be done, to add assay methods like those that are now official. Those of you who have been working along the line of alkaloidal assay of drugs know that only in a few instances does the Pharmacopœia give it, owing to the little knowledge which we have of the alkaloids in general. An enormous amount of work has yet to be done on the constituents of the alkaloids before we can have rational methods of assay. As long as we do not know what we are handling, we cannot hope to ascertain the essential constituents of drugs. This is quite true of the assay of the volatile oils; and to pick out any number of oils about which we know comparatively little, and determine a process of assay, would be very inexpedient and very unwise at present. It seems to me that a motion that would cover the ground as far as the advisability of adding methods of assay, as far as methods of assay can be devised at present or before the next revision of the Pharmacopœia, might be a good thing; at least that has been my experience in con-

nection with this kind of work. I have found, for instance, oils that were supposed to be good, that had the specific gravity given in the Pharmacopœia, and that came up to its requirements as far as the boiling point, and so on, are concerned, so adulterated that they did not deserve to be put side by side with the genuine article.

MR. HALLBERG: I should like to offer the following resolutions, which I believe Dr. Kremers would concur in. If not, he can modify them to suit his views. I have exempted Oil of Bay, because we all know the commercial article is not oil of bay leaves; and I believe that that would give the Committee of Research a chance to investigate the matter and report something more definitely.

*Resolved*, That the percentage valuation and limitation of the essential constituents of volatile oils be referred to the special Committee of Scientific Research, to report to this Association at next year's meeting, or at the meeting of two years hence.

*Resolved*, That the same committee be requested to report on the constitution of commercial oil of bay.

The resolutions were upon motion adopted.

Section 8 of the report referring to hyoscyne hydrobromate (see p. 126) was then read.

MR. CASPARI: I think this matter has been settled since the report was written. In the Pharmaceutical Journal a long article upon this subject by Dr. Hesse appeared very recently, and it will probably not require any more investigation at our hands, if we will only use the information given to us by Dr. Hesse.

It was moved and seconded that this section be passed. Carried.

Sections 9, 10, 11, 12, 13, 14, 15 and 16 (see p. 126) were next read.

MR. FENNEL: I move that the recommendations of the committee to dismiss whiskey, brandy and wines from the Pharmacopœia be endorsed. We must admit that a stigma has been cast upon the pharmaceutical profession by the sale of liquors.

The motion having been seconded was discussed at some length, and with considerable spirit, by Messrs. Ebert, Thompson, Remington, Caspari, Hallberg, Good, Patch, Fennel and Payne. A vote being taken on the adoption of the motion, the same was declared lost.

Section 17, relating to the dismissal of certain fluid extracts and tinctures, and the introduction of 50 per cent. tinctures in place thereof (see p. 127), was read. Dr. Rusby moved that the recommendation be not concurred in, which motion having been duly seconded called forth a lengthy discussion participated in by Messrs. Ebert, Remington, Caspari, Hallberg, Butler, Alpers, Stevens, Rusby and Bartley.

Mr. Hallberg having moved as a substitute for Dr. Rusby's motion that the subject of Section 17 be referred to the Section on Pharmacy, Materia Medica and Therapeutics of the American Medical Association, the amendment was carried.

Section 18, referring to the preparation of tincture of deodorized opium (see p. 127) was read, but not discussed, the author of the proposed improved formula not being present.

Sections 19, 20 and 21, relating to change of pharmacopœial standards for linseed, white and black mustard, powdered acacia and gamboge, as well as to the use of cane sugar in syrups (see p. 127), were read, and on motion of Mr. Hallberg, seconded by Dr. Bartley, referred to the special Committee on Scientific Research.

Section 22, relating to the composition of Dover's powder (see p. 127), was read, and after some discussion by Messrs. Remington, Whelpley, Bartley, Ryan and Stewart, referred to the Section on Pharmacy, Materia Medica and Therapeutics of the American Medical Association.

Sections 23 and 24, relating to change in the formulas for tincture of nux vomica and compound tincture of catechu (see p. 127) having been read, all sections of the report not otherwise referred were, upon motion of Mr. Hallberg, seconded by Mr. Ebert, referred to the Committee of Revision and Publication of the United States Pharmacopœia, with the exception of the section relating to the dismissal of wines and liquors, which was referred to the section on Pharmacy, Materia Medica and Therapeutics of the American Medical Association.

The Committee to whom had been referred the subject of the re-organization of the Research Committee presented the following report, which was upon motion adopted :

The Committee appointed by the Chairman to consider a plan and report upon the method to be adopted in the election of the Special Committee on Research of the Section on Scientific Papers beg to report the following recommendations :

" 1. That the Committee consist of four elective members to serve for two years, with the Chairman of the Committee on the Revision of the U. S. Pharmacopœia, and the Chairman of the Section of Scientific Papers as ex-officio members.

" 2. To carry out the election of this Committee, it is recommended that two of the members be elected to serve two years, and two others to serve one year."

A. B. PRESCOTT,  
W. S. THOMPSON,  
E. H. BARTLEY.

Upon motion of Mr. Hallberg, seconded by Mr. Good, the election of four members of the Special Committee on Research was proceeded with, Messrs. Prescott and Lloyd being elected for two years and Messrs. Kremers and Coblenz for one year.

The reading of papers being next in order of business, the following paper was read in abstract by Mr. Prescott :

## THE CAFFEIN COMPOUND IN KOLA.

BY JAMES W. T. KNOX\* AND ALBERT B. PRESCOTT.

[From the Committee of Research. American Pharmaceutical Association.]

## HISTORICAL.

Although the literature of kola extends back more than three hundred years, its chemical history is comparatively recent and may be briefly summarized as follows :

To Attfield† belongs the credit of proving that kola contains caffein ; his work was done at the instance of Dr. Daniell‡, who had made quite a study of the uses of kola among the natives of Western Africa, and who suspected from its physiological effects that it contained a stimulating principle similar to that of coffee and tea. Their supply of material was limited and they seem to have carried their investigation into its chemistry no further.

In 1882 Heckel and Schlagdenhauffen§ reported a more complete analysis of kola differing especially from that of the earlier workers in that it showed, in addition, the presence of theobromin and tannin. Heckel also noticed that a body was present which seemed to him to present considerable analogy to cinchona red, and he applied the name kola red (*rouge de kola*) to it. This, he afterwards found, gave a sublimate of caffein upon heating sufficiently, and he supposed the alkaloid to be retained mechanically, although he was unable to remove it by prolonged treatment with chloroform.

Knebel|| working in the Pharmaceutical Institute at Erlangen under the direction of Prof. Hilger (now at Munich), took up the investigation at this point in 1892, and isolated a tannin-like body to which he ascribed the formula  $C_{14}H_{13}(OH)_3$  and which he named "Kola red." This is not to be confounded with the kola red of Heckel, for Knebel considered Heckel's product an indefinite mixture, or rather an impure form of a glucosid which he (Knebel) believed to be present in kola, and which he believed to be composed of equal molecular proportions of caffein, glucose, and "kola red." This glucosid he called "kolanin," and, although he had only the dry seeds of kola to work upon, he inferred, from the proportions of caffein and glucose found therein, that in the fresh seeds no caffein was free. He inferred that the whole was combined in the glucosid, which under the influence of a diastatic ferment (which he isolated), with

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\* Holder of the Stearns Fellowship in the University of Michigan.

† Pharm. Jour. Trans., 1865, (2) 6, 457.

‡ Pharm. Jour. Trans., 1865, (2) 6, 450

§ HECKEL and SCHLAGDENHAUFFEN, 1882; Repert. de Pharm, p. 163.

|| E, KNEBEL, 1892: Apoth. Zeit. 7, 112.

air and moisture, was partially decomposed, during the process of drying, into its component parts.

This hypothesis also seemed to explain why different workers, using different samples of the drug, had failed to get uniform results in the yield of caffein, for only the free alkaloids are removed by the immiscible solvents usually employed in assaying, combined alkaloids remaining behind. Different conditions in drying would give a variable extent of decomposition of this (hypothetical) glucosid, and consequently afford discordant results in assaying.

Prof. Dr. Hilger\* had noticed the apparent untrustworthiness of the usual assay methods in the examinations of cacao as well as of kola and was led by Knebel's results to investigate the chemistry of cacao, working at Erlangen. He succeeded in separating a glucosid from cacao analogous to the one Knebel supposed to be present in kola, and which yielded on hydrolysis with dilute mineral acids, theobromin, dextrose and cacao red,  $C_{17}H_{12}(OH)_{10}$ , similar to kola red. The dextrose formed with phenyl hydrazin a glucosazone of m. p.  $204^{\circ}C$ . Later,† at Munich, he applied the same and similar methods to kola, using the fresh seeds, and obtained a body, the "kolanin" of Knebel, yielding caffein, dextrose, and kola red on decomposition with dilute mineral acids, or diastatic ferments. He also describes in his paper his method for separating the ferment of kola, these details having been omitted from Knebel's original article.

Prof. Dr. Hilger has also kindly sent us the Inaugural-Dissertation‡ for Schweitzer for which we here make grateful acknowledgement. Schweitzer continued the work on kola and cacao, begun by Knebel and Hilger, verifying their results. His work on the (supposed) glucosid of kola indicates the combination of one molecule each of caffein and kola red, and three of dextrose, instead of one of each as claimed by Knebel. He proposes the formula  $C_{46}H_{36}N_4O_{21}$  for "kolanin."

Another feature of his work on kola is, that while in the free alkaloids the proportion of caffein is to theobromin as 98.8 : 1.2 in the "glucosid," he found it to be 80.3 of caffein to 19.7 of theobromin.

Of American workers, Schlotterbeck§ and Topping|| have done good service; Dohme and Englehardt¶ have published reports of comparative assays of African and West Indian kolas. They found the African superior.

\* A. HILGER, 1892: Apoth. Zeit. 7, 469.

† A. HILGER, 1893: D'tsch. Vierteljahresschrift f. öffentl. Gesundheitspflege, 25, 559. Drittes heft.

‡ CARL SCHWEITZER, 1895: Inaugural-Dissertation zur Erlangung der Doktorwuerde, Munich.

§ Kola: Monograph by J. O. SCHLOTTERBECK, Detroit, 1894.

|| C. O. TOPPING, 1894: Proc. Am. Pharm. Assoc., p. 178.

¶ DOHME AND ENGLEHARDT, 1896: Am. Drugg., p. 12.



Other recent contributors are Kilmer,\* whose paper is principally a compilation, and Jean,† who examined a number of commercial preparations of kola, *i. e.*, its fluid extracts, tinctures and wines.

A partial plant analysis of kola was made last year by one of us, with Prof. Schlotterbeck.‡

#### THE SAMPLE.

Through the liberality of Messrs. Frederick Stearns & Co., Manufacturing Pharmacists of Detroit, Michigan, we were supplied with a large original package of kola nuts, just as imported by them from West Africa. The basket had not been opened, and the seeds were perfectly fresh, and were fine specimens. The best of these were selected, and as a means of preservation they were sealed up air-tight in clean and dry glass-stoppered jars. In about one-half the number of jars the air was displaced by dry carbon dioxid, and in a few others the red and white seeds were put up separately. That the carbon dioxid did not inhibit fungus growth, was shown by the appearance after five months' duration of a slight moldiness on some of the seeds put up in this atmosphere as well as on those preserved in air. This was not universally the case. At this time, after the expiration of nine months, we have several jars of the drug put up in exactly the same way, and at the same time in which the seeds are fresh and sound. Those preserved in carbon dioxid are somewhat paler, but internally are apparently unchanged, and a greater proportion of the seeds in this atmosphere, remained in prime condition, so that there would seem to be a slight advantage in its use. It is a rather remarkable fact that in those jars containing only red or only white seeds, there was no perceptible decomposition or fungus growth, and this regardless of the atmosphere used.

#### *Action of Solvents.*

When a fresh kola seed is cut or bruised a chemical change immediately takes place, as shown by the rapid change of color of the cut surface from pink or cream-color to red-brown.

Desiring to avoid any decomposition of the drug in handling, a solvent was sought which would remove the active constituents without change. Water, absolute alcohol, ninety per cent. alcohol, fifty per cent. alcohol, ether, chloroform, benzene, acetone, ethyl acetate, dilute ammonia water, dilute potassium hydroxid solution, one per cent. hydrochloric acid, alcohol containing one per cent. of acetic acid, and glycerin, were the principal solvents tried. All were objectionable because the red coloration appeared almost immediately on contact of the cut surface of the drug with

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\* F. B. KILMER, 1896; Am. J. Pharm., 68, 96.

† J. JEAN, 1896: Repert. de Pharm. (3), 7, 49.

‡ KNOX and SCHLOTTERBECK, 1895: Analysis of Kola, Proc. Am. Phar. Assoc., p. 334.

the liquid, coloring the solvent, if the coloring matter were soluble therein. Slicing the seeds under the surface of any of these liquids apparently neither retarded nor modified the formation of color.

Water was at first colored red, but gradually became turbid from precipitation of a portion of the matter at first dissolved; the alcohol of either strength gave a rich wine-red solution, which was permanent. The immiscible solvents removed only alkaloids and fat; both fixed and volatile alkalies developed an intense dark crimson color, changing to light scarlet on addition of excess of mineral acids, which change was accompanied by precipitation of a reddish flocculent substance; dilute acids heightened the color somewhat; glycerin seemed only to dehydrate the tissues without exerting solvent power.

#### *Action of Heat.*

This coloration has usually been ascribed to the activity of a diastatic ferment, and, therefore, recalling the action of heat on such bodies, it was decided to try the effect of sterilization on this drug. Accordingly a seed was sliced, the slices being received in boiling water. No coloration took place then or afterwards, a few seconds contact with the boiling water being sufficient to prevent its appearance. Further experimentation showed that up to 60° C. the heat augmented the production of color; from 60° to 65° it was somewhat retarded, and above 65° the slices retained their natural color.

On account of the starch present in kola, and for other reasons, the use of water was objectionable, so boiling alcohol was substituted successfully, and has been used exclusively by us for this purpose ever since. A temperature of 45° C. is sufficient when alcohol is employed to "coagulate the ferment," at least to prevent the coloration afterwards. Boiling chloroform and boiling acetone were each tried, but without successful results. Without further discussion of the action of solvents, it may be remarked that for pharmaceutical purposes, and any others, when it is desirable to extract all the active constituents from kola with a single menstruum our experience has shown that alcohol of not less strength than U. S. P. dilute alcohol is the most satisfactory agent.

#### *Action of Cold.*

It has been stated\* that extreme cold seems to destroy the power of this ferment. An experiment, next described, seems to show that cold does not impair the potency of the ferment, but rather seems to preserve it. Two white kola seeds were sealed up in a dry bottle and immersed in freezing mixture for three hours. On thawing the production of the red-brown color was very rapid both upon cut and whole surfaces.

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\* KILMER, 1896: Am. J. Pharm., 68, 104.

## ASSAY OF KOLA.

*Common Causes of Error.*

Of the numerous methods proposed at various times by different workers for the assay of this drug, none has proven satisfactory and reliable. Many of these do not account completely for the free alkaloids of kola, and not at all for the combined alkaloids: others perhaps indicate pretty well the proportions of free alkaloids. Still, concordant results are not obtained, and the published assays of kola have a wide range of variation. Two reasons for these discrepancies have suggested themselves to us. First, insufficient knowledge of the properties of the combination bearing caffein has prevented the use of proper methods to secure complete liberation of the alkaloids from it; second, the caffein obtained is *weighed*, in a state of greater or less purity, varying with the method used and the care and judgment of the worker. It is not difficult to perceive how errors might thus be introduced.

We have worked out a plan of assay for kola especially intended to avoid these and some other common sources of error: it has been used by us in all the assays reported herein and in many others, and has given uniform and concordant results, higher than any we have yet seen. We offer it with a confidence based on experience.

*Volumetric method for caffein determination.*

Before giving the details of manipulation for assay, it may be well to describe the volumetric method for the estimation of caffein which is substituted for gravimetric methods.

This new process, given by Gomberg,\* is based upon the very complete precipitation of caffein by Wagner's reagent from aqueous solutions when these are acidulated with mineral acids—a fact which seems to have been pretty generally overlooked by the text-books bearing upon the subject. This oversight is, no doubt, traceable to the fact that caffein, being soluble in water, with a neutral reaction, and not forming salts permanent in water, is taken as free alkaloid for all tests in the wet way. Other alkaloids, for the most part, are taken in their salts, for reactions in solutions, their salts having the neutral reaction. Therefore the Wagner's reagent, like other reagents, was generally applied to the caffein solution without the presence of any acid, and under such conditions, it is true, as stated in the text-books, that "caffein is not precipitated by Wagner's reagent."

Gomberg recently investigated the subject at considerable length. Without entering into discussion of other features of his work, it may be stated briefly that he found that an aqueous solution of caffein, even so dilute as 1:8000, is precipitated by Wagner's reagent in the presence of mineral acid, and that the precipitate formed is constant in composition

\* M. GOMBERG, 1896; J. Am. Chem. Soc. 18, 331

( $C_8H_{10}N_4O_2HI_2$ ) in varying conditions of formation.\* Having established these facts, practical application of them was made for the volumetric estimation of caffein. A short outline of the principal features of this method follows.

A definite volume of Wagner's reagent of known strength is added in excess to the measured caffein solution slightly acidulated with sulfuric or hydrochloric acid, and the clear liquid is decanted off after the precipitate has settled or is filtered through asbestos after five minutes' standing. The excess of iodine is titrated with decinormal sodium thiosulphate solution, using an aliquot portion of the filtrate. From this the number of Cc. of decinormal Wagner's reagent can be calculated, which number multiplied by .00485 equals the weight of the anhydrous caffein.

We have had considerable experience with this process for estimating caffein, as one of us (K.) furnished the original analytical data for Dr. Gomberg's paper, and we have employed it almost exclusively in the work upon the caffein compound since that time.

The table of results is here reproduced from Gomberg's article. By way of explanation it may be said that solutions of caffein of respectively 0.25, 0.50, 0.75 and 1.00 per cent. strength were used, the acidulation was with sulfuric acid, and Wagner's reagent was employed in varying proportions, using a very slight excess over the theoretical amount, one and one-third times the theoretical amount, twice the theoretical amount, and one-half the theoretical amount. The results show that the method accounts very accurately for the caffein, especially when the iodine solution is in considerable excess.

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\* Further see GOMBERG, 1896; Perhalides of Caffein, J. Am. Chem. Soc., 18, 350.

TABLE No. I.

	I. Solution containing 0.25 per cent. of caffeine.			II. Solution containing 0.50 per cent. of caffeine.			III. Solution containing 0.75 per cent. of caffeine.			IV. Solution containing 1.00 per cent. of caffeine.			V. Solution containing 0.50 per cent. of caffeine.		
	Taken.	Found.	Per cent. recovered.	Taken.	Found.	Per cent. recovered.	Taken.	Found.	Per cent. recovered.	Taken.	Found.	Per cent. recovered.	Taken.	Found.	Per cent. recovered.
Wagner's reagent employed.															
Theoretical quantity plus 2 c.c. ....	0.0600	0.0591 0.0589	98.33	0.1200	0.1175 0.1175	97.82	0.1500	0.1481 0.1471	98.40	0.1200	0.1182 0.1179	98.38	0.1200	0.1154 0.1165	96.78
$1\frac{1}{3}$ times the theoretical quantity ...	0.0750	0.0749 0.0749	99.88	0.1200	0.1191 0.1189	99.17	0.1500	0.1489 0.1485	99.13	0.1200	0.1191 0.1187	99.12	0.1200	0.1196 0.1197	99.75
Twice the theoretical quantity .....	0.0500	0.0502 0.0506	100.80	0.0800	0.0805 0.0789	99.63	0.1200	0.1184	98.67	0.1100	0.1091 0.1091	99.18	0.0800	0.0802 0.0791	99.63
One-half of the theoretical quantity .	0.0750	0.0363 0.0363	48.40	0.1600	0.0794 0.0794	49.62	0.2250	0.1107	49.20	0.2000	0.1067 0.1067	53.35	0.1600	0.0791 0.0791	49.44

Columns I, II, III, and IV show the results obtained by decanting the clear liquid after the solutions had stood for one hour. In column V the results are those obtained by filtering the solution for titration through asbestos after five minutes standing.

TABLE NO. 2.\*

Wagner's reagent employed.	Caffein Solution 0.25 %.			Caffein Solution 0.50 %.		
	Taken.	Found.	% Recov.	Taken.	Found.	% Recov.
Theoretical quantity + 2 c.c.	0.0500	0.0487 0.0492	97.90	0.0500	0.0468 0.0479	94.7
$1\frac{1}{3}$ times the theoretical quantity.....	0.0200	0.0204 0.0198	100.50	0.0675	0.0642 0.0639	94.89
Theoretical quantity $\times 2$ ..	0.0250	0.0251 0.0245	99.20	0.0500	0.0480 0.0490	97.00
$\frac{1}{2}$ of the theoretical quantity .....	0.0250	0.0119 0.0128	49.40	0.0600	0.0275 0.0281	46.33

In table No. 2 are given the results obtained where a considerable excess, 8 per cent. to 10 per cent., of sulfuric acid is used. The results are not very uniform and show that slight acidulation gives greater accuracy in the estimation.

The manipulations used by us are as follows: The caffein to be estimated is dissolved in water acidulated with sulfuric or hydrochloric acid (preferably the latter†), avoiding an excess, and made up to a definite volume. The acid strength of this volume should be about one per cent. If the quantity of solution is not large, *i. e.* not more than 40 or 50 Cc. the whole is taken, if large an aliquot portion is measured from a burette. Standard Wagner's reagent is run in from a burette, ten Cc. at a time, shaking the solution after each addition and allowing to stand a few moments so that the color of the supernatant liquid may be observed. When this liquid becomes wine-red the iodine solution is in sufficient excess, and the volume of Wagner's reagent added is read, at the same time noting the total volume of the mixed solutions. The caffein periodid is filtered out, after five minutes standing, with a dry asbestos filter, the filtrate collected in a clean dry vessel and transferred to the same clean and dry burette from which the caffein solution first, and later the iodine solution, were measured. (If calibrated burettes are used it is, of course, not necessary to employ the same one each time.) From this an aliquot portion is measured into a porcelain dish and exactly neutralized with tenth normal sodium thiosulphate. Each Cc. of Wagner's reagent consumed = 0.00485 of caffein. The following example will illustrate the method of calculation:

\* This table is not given by Gomberg.

† Caffein solution 1:10000 acidulated by hydrochloric acid is precipitated by Wagner's reagent, while 1:8000 is the limit if sulfuric acid be used.

"Unknown" Caffein solution 30 Cc. + 30 Cc. Wagner's reagent = 60 Cc.

30 Cc. Filtrate = 6.2 sodium thiosulphate solution.

Whole solution (60 Cc.) containing 30 Cc. W.r. = 12.4 " " "

30 Cc. Wag. reagent. — 12.4 Cc. thiosulphate = 17.6 consumed by caffein.

17.6 Cc. Wag. reagent  $\times .00485 = .08536$  caffein.

The asbestos filters described are conveniently prepared by placing a small perforated platinum disk in a medium sized carbon tube; on this a layer of glass wool one-fourth of an inch in depth is placed. By aid of a good filter pump finely divided asbestos pulp, previously acid-washed, and suspended in water is deposited in thin layers by pouring on in small portions and applying suction. This is continued until a layer of asbestos three-fourths to an inch in height is obtained. By keeping the asbestos mixture well stirred during the first part of the operation and allowing it to settle during the latter, the coarser particles will be deposited in the lower layers and the finer ones on the top. The filter is now washed, successively, with hot water, alcohol and ether, and after drying 20 minutes at 80–100° C., is ready for use.

In the event that it is desired to decant the liquid for titration, instead of filtering, it is advisable to perform the precipitation in a tall slender cylinder or test-tube on foot. After the precipitate has settled compactly the end of a burette is immersed in the liquid to the desired depth, and the liquid drawn upward by means of suction produced by a rubber bulb fitted to the top of the burette.

The precaution is always taken, of course, to have the caffein free from any other substance that will affect the iodine solution, and to perform the precipitation in cold solutions.

By the exercise of ordinary care and judgment this method for the estimation of caffein will be found extremely accurate and satisfactory, while with a small amount of practice it admits of very rapid work. Having used it in more than one hundred estimations recently we feel qualified to recommend it.

#### MANIPULATION IN THE ASSAY OF KOLA.

##### *Preparation of Sample.*

Slice a sufficient quantity of the fresh seeds in thin papery slices, allowing them to fall in a beaker of boiling alcohol.\* An ordinary potato slicer is a very convenient and effective instrument for this purpose. Remove the slices after a few moments boiling, and allow them to dry spontaneously on clean glass plates. Distill the alcoholic solution, under reduced

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\* The boiling alcohol kills the ferment and also dries the drug quickly. While it will appear later that this ferment, contrary to the general opinion, has but little if any influence on the production of free caffein from the caffein compound, the use of alcohol has nevertheless been retained as an efficient drying agent, and one that preserves the drug apparently without allowing any chemical change whatever to take place.

pressure,\* to a syrupy consistence, and pour it on the sliced drug now being dried, rinsing the flask with successive small portions of alcohol. When dry remove the drug to a mortar, wash the glass plates with a few Cc. hot alcohol, and pour this on the drug which is to be finely powdered, and preserved in dry glass stoppered jars. The powder prepared in this way corresponds closely to the original color of the seeds, being but slightly paler in each instance. There can hardly be any doubt that it represents correctly the fresh seeds, with subtraction of the water, and perhaps of a portion of the trifling amount of volatile oil they contain.

#### *For Free Alkaloids.*

Weigh accurately five grams of the sample, transfer to a Soxhlet's extraction tube, and treat for six hours, or until exhaustion is complete, with chloroform. Evaporate the chloroform, and to the residue add 30 Cc. of hot one per cent. hydrochloric acid, and filter to remove fat, rinsing out the flask with several small portions of hot water, passing these through the filter, and washing the filter three or four times with hot water. The united filtrate and washings now amount to about 70-75 Cc. Concentrate in a porcelain capsule on a water-bath to about 10 or 15 Cc., transfer to a graduated cylinder, which has been carefully compared with the burette to be used for the Wagner's reagent, and rinse the capsule with three or four successive portions of hot water, making up the volume in the cylinder to 30 Cc. after cooling. Now run in from the burette 30 Cc. standard Wagner's reagent, and agitate well. Filter through asbestos after five minutes, and pour the filtrate into the same burette, previously washed and dried. About 55 Cc. will be recovered. Run out an aliquot portion of the liquid (say 30 Cc.), and neutralize the excess of iodine with decinormal sodium thiosulphate solution, then from the result calculate the number of Cc. of iodine solution consumed. Multiply this number by 0.00485 to obtain the weight of the anhydrous caffeine. With another aliquot portion of the filtrate make a duplicate titration.

It will be observed that the alkaloids are estimated only as caffeine. Theobromine also is precipitated by Wagner's reagent, but its proportion, 1.48 to 100.00 of total alkaloids, is so small that the error introduced by the difference in the factors of the alkaloids is not appreciable.

#### *For Combined Alkaloids.*

After the exhaustion with chloroform add alcohol of 90 per cent. to the drug, which is still contained in the extraction tube, and continue the treatment until exhaustion is complete, as shown by the absence of color in the portion of menstruum last siphoned over in the apparatus. Two or

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\* The object being to avoid the decomposition of the caffeine-bearing combination by the hot water remaining after the alcohol is evaporated.



three hours are usually sufficient. This alcoholic solution may be treated in either of the following ways :

(a) Evaporate the solution to dryness in a tared porcelain capsule, and weigh. Take a small portion (0.200 or 0.300 Gm.), and determine the amount of nitrogen by combustion. This nitrogen is entirely alkaloidal, as proteid substances are not extracted from the drug by the strong alcohol, and the total nitrogen can be calculated into caffeine. From the amount of caffeine found by combustion of the aliquot portion calculate the total amount present in the whole extract.

(b) To the hot alcoholic solution add an excess of freshly precipitated lead hydroxid (litharge or lead carbonate will not answer), and digest on a water-bath for a few minutes, until the supernatant fluid is colorless. Then transfer to a porcelain capsule, rinse the flask with hot alcohol, mix with clean white sand, evaporate the mixture to dryness, and place the whole in the extraction tube. Treat with chloroform three or four hours, and determine the caffeine volumetrically as previously directed.

We present herewith a table showing the results we have obtained by this plan of assay :

The Sample.	Moisture, per cent.	Duplicates.	Fresh Kola.			Dried Kola.		
			Free Alkaloids. Per cent.	Comb. Alk. Per cent.	Total.	Free Alkaloids. Per cent.	Comb. Alk. Per cent.	Total.
No. 1. Dried kola. (Mixed.)	6.16	I.				1.859	1.783	3.642
		II.				1.828	1.836	3.664
		Average.				1.843	1.809	3.653
No. 2. Fresh kola, red and white seeds.	53.9	I.	0.512	0.927	1.439	1.111	2.011	3.121
		II.	0.556	0.841	1.397	1.206	1.834	3.040
		Average.	0.534	0.884	1.418	1.158	1.922	3.080
						Calculated for "dry."		
No. 3. Fresh kola, red and white seeds, very moldy.	53.9	I.	0.590	0.815	1.405	1.280	1.770	3.050
		II.	0.548	0.893	1.438	1.190	1.938	3.128
		Average.	0.569	0.854	1.423	1.235	1.854	3.089
No. 4. Fresh kola, white seeds.	51.2	I.	0.595	1.029	1.624	1.220	2.110	3.330
		II.	0.562	1.006	1.568	1.153	2.060	3.213
		Average.	0.578	1.018	1.596	1.186	2.085	3.271
No. 5. Fresh kola, red seeds.	57.3	I.	0.503	0.687	1.190	1.180	1.610	2.790
		II.	0.452	0.700	1.152	1.060	1.640	2.700
		Average.	0.478	0.693	1.171	1.120	1.625	2.745

In explanation of the foregoing results, it should be stated that sample

No., is not of the same lot of drug as the other four, but is one that was analysed in this laboratory last year, and is also African kola obtained then from the house of Frederick Stearns & Co.

In order to facilitate comparison of the fresh and dry drug, the percentages of alkaloids obtained from the fresh have been also calculated for the corresponding amount of dry kola.

These results are much higher than those usually seen, the main difference being that our method accounts for both free, *and combined* alkaloids. It will be seen that about one-half of the total alkaloids of dry kola exist in combination, and in the fresh seeds more than sixty per cent. of the alkaloids are "combined." It should also be noted that so far as the yield of alkaloids is concerned, the moldy kola does not differ from that in perfect preservation. Furthermore there is a difference between the red and the white seeds, as shown by the percentages of alkaloids and moisture.

#### *Method of Dohme and Engelhardt.*

Dohme and Engelhardt\* have examined the method employed by Schlotterbeck and Knox† and have proposed another one in its stead which has in their hands, given higher results. Their process requires to boil the dried and powdered drug in thirty per cent. alcohol for two hours, filter, evaporate the filtrate to dryness with sand and magnesia and exhaust this residue with chloroform. The residue left after evaporation of the chloroform is dried at 100° C., and weighed as caffein. Using this method they have obtained 2.10 per cent. of caffein from African kola.

We have given their method a careful trial with the gravimetric results stated next below, the sample used being No. 1 of the foregoing table—

- I. 2.04 per cent.
- II. 1.93 " "

#### *Sources of Error.*

That the caffein thus obtained, although apparently pure, is not so in reality, is shown by the fact that when titrated with Wagner's reagent, the per cent. is much lower.

- I. 1.76 per cent.
- II. 1.68 " "

There are still other objections to the method. The treatment with thirty per cent. alcohol does not remove all the free alkaloids, for the drug under assay after having been boiled with the alcohol and washed, as directed, was dried and treated with chloroform in an extraction appara-

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\* Am. Drugg. 1896. p. 12.

† Proc. Am. Pharm. Assoc. 1895, p. 334.

tus. The residue left after evaporation of the chloroform gave positive test for caffein. Nor does the diluted alcohol remove all the combined alkaloids, for after the treatment with chloroform just described, strong alcohol was added to the drug in the extraction tube, and the extraction continued. The wine-red solution obtained was treated with an excess of lead hydroxid, filtered and the clear colorless solution evaporated to dryness. This residue also contained caffein.

It appears that the combined alkaloids removed by the 30 per cent. alcohol in Dohme's process and treated with magnesia and sand are not completely liberated by this treatment, and consequently are not removed by the chloroform. For after this magnesia-sand residue had been exhausted by chloroform as directed, strong alcohol was used as a menstruum, and it removed another portion of combined caffein, identified by the lead hydroxid treatment above mentioned. In our hands, with careful manipulation the greatest amount of actual caffein obtained by this method is a little less than one-half of the total amount present as shown by assay after the process described in this article.

Thanks are due to MR. ROBERT J. NISBET, Ph. C., for valuable assistance rendered in the assays and in the analyses by combustion.

#### "GLUCOSID" OF KOLA.

In the literature of kola is found frequent mention of a glucosid yielding caffein, glucose, and "kola red" on decomposition.\* It has been stated that this glucosid is an extremely unstable body; that heat, moisture, dilute acids,† the ferment ‡ of kola, or diastase is sufficient to resolve it, partly or wholly, into its component parts.

It has even been suggested§ that no alkaloids exist free in the fresh seeds, but that they are wholly combined in this glucosid.

#### *Methods for Separation.*

The process used by Hilger,|| and later by Schweitzer‡ for the isolation of this so-called glucosid ("Kolanin") is as follows:—The drug is exhausted with alcohol, the extract evaporated to dryness, and the residue washed with water: then the insoluble portion is dissolved in weak alkali solution. To this dilute mineral acid is added in slight excess, when the "kolanin" is precipitated. It is collected by filtration, washed with water, and dried. It is a red brown amorphous powder, containing 0.9 per cent. of ash. We have prepared a number of specimens from both the fresh and

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\* E. KNEBEL, 1892; Ap. Zeit. 7, 112.

† A. HILGER, 1893; Dtsch. Vierteljahres. für Offent. Geshtspfl, 25, 559.

‡ C. SCHWEITZER, 1895. Inaugural-Dissertation, Munich.

§ KNEBEL, Loc. Cit.

|| Loc. Cit.

dried drug, by this process which we shall call Method I. For purposes of comparison we have also employed other processes. In one of these, Method II,\* the portion of alcoholic extract insoluble in water is dissolved in strong alcohol, and this solution then precipitated by the addition of about three volumes of ether. The precipitate is rapidly filtered at the pump, washed with ether, and dried in a vacuum desiccator over sulfuric acid. The product is a light impalpable powder, cream to light red in color, and is ash-free after three precipitations.

By another method (III) the residue left after washing the alcoholic extract with water was dried in a vacuum desiccator, powdered, and treated with chloroform to remove fat and whatever free alkaloids the water washing had left behind. Again dried and powdered, it furnished a product appearing much like that of Method I, but somewhat lighter colored.

We present herewith a table of results obtained by combustions of samples prepared from both the fresh and the dry seeds by the methods just described :

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\* In Methods II. and III., all distillations are carried on under reduced pressure.

## "GLUCOSID" OF KOLA.

	Calculated.		Found.												
	By Knebel: * $C_{14}H_{12}(OH)_6 +$ $C_9H_{12}O_4 +$ $C_8H_{10}O_3N_4$	By Schweitzer: † $C_{40}H_{56}N_4O_{21}$	Method I.				Method II.				Method III.				
			From dry seeds.		From fresh seeds.		From dry seeds.		From fresh seeds.		From dry seeds.		From fresh seeds.		
			I.	II.	I.	II.	I.	II.	I.	II.	I.	II.	I.	II.	
Duplicates.															
C .....	52.50	51.71	62.11	61.91	61.82	61.70	61.39	61.71	62.16	61.96	62.06	62.22	61.43	61.26	
H .....	6.25	6.03	7.06	7.12	6.98	7.16	6.62	6.79	7.05	7.16	6.80	6.96	6.87	6.98	
N .....	8.75	6.03	8.04	7.74	6.04	5.97	5.89	5.67	6.23	5.95	6.92	6.74	6.13	5.94	
O .....	32.50	36.23	22.79	23.23	25.16	25.17	26.10	25.83	24.56	24.93	24.22	24.08	25.57	25.82	
Caffein by calculation from the N.	30.31	20.88	27.85	26.81	20.92	20.68	20.40	19.64	21.58	20.61	23.97	23.34	21.23	20.57	

\* Assumed from the proportions of free caffein and glucose found in dry kola.

† Assumed from the respective yields of alkaloids and glucose by hydrolysis of the "glucosid."

We do not at present enter upon interpretation of the above results for carbon, hydrogen and nitrogen,\* but leave their study until further work on this body, as now planned, shall have been finished. It seems to be largely a question of structure, and this must be settled before it can be positively stated whether the caffein compound in kola is a glucosidal body, or only a glucosid-bearing body. And, of these, the one may not differ from the other except in the order of its stages of decomposition. There is much evidence tending to show that this so-called glucosid is in reality a mixture of tannates of caffein and theobromin, and that the glucose obtained on hydrolysis is split off from the tannin. These evidences are given a little later on in this paper.

After combustion, the next step was to ascertain, if possible, whether the nitrogen was wholly that of the alkaloids or not.

#### *Action of Dilute Acids.*

It was attempted to recover the caffein, quantitatively, and for this purpose hydrolysis with dilute mineral acids was first resorted to.

Following carefully the methods of Schweitzer, viz: to boil the "glucosid" for from four to six hours with twenty times its weight of five per cent. sulfuric acid, filter, neutralize the filtrate with barium carbonate, filter again, and estimate the caffein and glucose in the clear filtrate made

\* Following are the figures, respectively, of Schweitzer and of Hilger, for the cacao glucosid, the former by calculation from the yield of alkaloids and glucose, the latter by analysis (Deutsch. Vierteljahr. Öffentl. Gesundh., 1893, 25, 559).

	Cacao Glucosid.	
	Calc. by Schweitzer: $C_{80}H_{98}O_{15}N_4$	Found by Hilger: $C_{88}H_{98}O_{20}N_4$
C. ....	65.34	52.85
H .....	7.80	6.22
N.....	5.08	3.63
O.....	21.78	37.30

up to a definite volume, we are unable to obtain results concordant with his. The method was also varied to admit of the removal of the dissolved tannin which remains in the clear filtrate after neutralization with barium carbonate, by precipitating it as lead tannate, filtering, removing excess of lead salt with hydrogen sulfid and boiling off the latter.

The strength of the acid used was varied from two to twenty per cent. and the time of boiling from two to ten hours. But in no case was the amount of caffein recovered equal to that indicated by the nitrogen percentage. In the samples used, the calculated proportion of caffein was, in round numbers, from 21.00 per cent. to 24.00 per cent. Yet 15.00 per cent. was the greatest amount recovered, and the other amounts varied from that down to 4.76 per cent., the lowest.\*

Hydrochloric acid diluted to the same strength was next tried with somewhat better but very unsatisfactory results.

It was now in order to institute a control analysis to determine whether or not all the caffein could be recovered after such treatment as has been described. To this end an experiment was made, as follows:

Duplicate samples of .300 Gm. pure caffein, and .500 Gm. pure kola tannin were boiled together with 30 Cc. five per cent. sulphuric acid, after which the caffein was estimated in the way above described.

I. Taken .300.	Recovered, .2635.	Loss, 12.17 per cent.
II. " .300.	" .2541.	" 15.30 "

This loss suggested the possibility that some of the caffein might have combined with the tannin. Accordingly the reddish residue filtered out after boiling with acid was dried and exhausted with chloroform to remove all traces of free caffein. Then boiling alcohol was used as a menstruum, and gave a wine-red solution which was treated with lead hydroxid. The clear filtrate on evaporation gave positive evidence of caffein, both by appearance of the crystals and by chemical tests, showing that caffein tannate is actually *formed* during this process of treatment. Now if this is the case, it is hardly to be expected that the so-called "kolanin," a body very similar in properties to caffein tannate, would be quantitatively *decomposed* under exactly the same conditions. Indeed the experiments already

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\* In this case the extremely low result is to be attributed in part to decomposition of the caffein in the course of the analysis. The tannin dissolved was removed in the way recommended by the U. S. Dept. of Agriculture, Division of Chemistry, Bulletin 46, p. 72, *i. e.*, by precipitation with lead acetate, and removal of excess of lead from the filtered liquid by the addition of sodium carbonate. The low result suggested the possibility of the decomposition of caffein by the solution of alkali carbonate, it being well known that alkali hydroxid solutions effect a decomposition into caffeidin, etc., on heating. So an experiment with a known quantity of pure caffein was tried—.110 gram caffein was boiled with ten per cent. sodium carbonate solution for four hours; and the caffein estimated volumetrically, .0593 gm. being recovered, a loss of 46.1 per cent.

described have shown that it is not. Nor is the statement\* borne out that twenty per cent. sulfuric acid decomposes this natural combination of caffeine completely, as the experiment described next below demonstrates.

1.250 Gm. of the so-called "glucosid" were boiled vigorously with 40 Cc. of 20 per cent. sulfuric acid, and then filtered. The insoluble residue was examined in the way described in the preceding experiment, and "kolanin," apparently unchanged, was found, the evidence being quite positive.

Furthermore, it is not improbable that the hydrolysis of this substance is attended with incomplete recovery of the alkaloid liberated, for the four filtrations necessary, viz., for removal successively of the insoluble red residue, barium sulfate, lead tannate and lead sulfid are very likely to be accompanied by a loss of caffeine from its adhesion to the moist bulky precipitates.

Hydrolysis with dilute acids having been shown to be unsuited for the purpose of recovering completely the alkaloids from their natural combination, other and entirely different means were resorted to.

#### *Action of Lead Hydroxid.*

Recalling the fact that this so-called glucosid bears a close resemblance in properties to alkaloidal tannates, and in view of the action of lead hydroxid on this class of bodies, it was decided to try its effect upon "kolanin." Qualitative experiments to this end proving successful, it was next in order to ascertain whether or not the liberation of caffeine was quantitative, and a full recovery possible. For this purpose 0.500 Gm. of the so-called "kolanin," whose average nitrogen content indicated 0.1052 Gm. caffeine, was dissolved in 25 Cc. hot ninety per cent. alcohol. To this, freshly precipitated lead hydroxid previously triturated with hot alcohol to a smooth cream was added, until, after a few moments' standing to allow subsidence of the precipitate, the liquid was clear and colorless. The mixture was then evaporated to dryness on a water-bath, clean dry sand added to give the requisite volume, the whole then transferred to a Soxhlet's tube, and the beaker carefully rinsed with chloroform, the rinsings being added to the contents of the tube. Chloroform was then added, and extraction continued for two hours. The chloroform solution was then evaporated, and the caffeine estimated volumetrically, 0.1040 Gm. being recovered.

This treatment does not decompose caffeine, for 0.200 Gm. pure caffeine dissolved in alcohol with .500 Gm. pure kola-tannin and treated as above described yielded .1991 Gm. on volumetric estimation.

This simple and rapid process for liberating the caffeine from the caffeine compound affords a means for a very accurate determination of the combined alkaloids of kola, of which fact use has been made in the method of assay proposed and used by us, as previously described.

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\* KILMER, 1896: Am. Jour. Phar., 96.



This reaction of kolanin with lead hydroxid indicates a tannate-like character for the body. There is reason to think that the glucose obtained by decomposing this so-called glucosid with mineral acids exists primarily in combination with the tannin-like body, for after chloroform had removed all the caffein from the mixture of alkaloids, lead salt, lead hydroxid and sand, described above in the experiments with "kolanin," treatment with water removed nothing further. The liberation of glucose therefore is not necessarily simultaneous with that of caffein, nor in consequence of it. This was further shown by decomposing the lead salt formed by the red coloring matter, through treatment with hydrogen sulfid, and thereby recovering the colored body previously combined with the caffein. This body so obtained, gives all tannin reactions towards iron salts, alkaloids, gelatin, etc., and has a pronounced astringent taste. On treating it with dilute mineral acid, in the manner directed by text books\*, very positive evidence of glucose was given, not only by its behavior with Fehling's solution, but with phenylhydrazin as well, of which mention is made later. The foregoing facts would seem to indicate that the so-called "glucosid" is a combination of caffein (and theobromin) with a glucosid tannin.

*(Artificial) Kola-tannate of Caffein. Method of Preparation.*

By way of further investigation into this question we undertook to prepare artificially from kola-tannin and pure caffein a similar product which we proposed to compare with the natural compound. This was successfully accomplished as follows: An aqueous infusion of kola is poured into a ten per cent. solution of caffein acidulated with hydrochloric acid. The presence of acid is necessary to obtain an aqueous caffein solution of sufficient concentration, and especially to avoid the re-solution of the tannate of caffein which takes place in the neutral solutions in the presence of an excess of either tannin or caffein. The precipitate, abundantly formed, is rapidly filtered at the pump, washed with cold water, and well drained. It is then dissolved in alcohol, and filtered to remove insoluble extraneous matter carried down in precipitation. The alcohol is then distilled off under reduced pressure until the solution has reached a syrupy consistence, and the evaporation continued to dryness over sulfuric acid in a vacuum desiccator.

*Properties of "Kolanin" and "Caffein Kola-tannate" compared.*

The product obtained is identical in appearance and sensible properties with the so-called kolanin. Both are insoluble in water, ether, chloroform and cold dilute mineral acids; freely soluble in alcohol with dark wine color, from which solution they are re-precipitated by two or three volumes of ether; soluble in dilute acetic acid, more easily on warming; sparingly soluble in warm acetone; soluble in warm neutral caffein solution,

\* Prescott: Organic Analysis, 467.

and in warm kola-tannin solution; quite soluble in dilute alkali (both fixed and volatile) solution\* with production of a very dark color, and at once reprecipitated therefrom by dilute mineral acids in slight excess, also by acetic acid, though the precipitate redissolves in an excess of the acetic acid on warming. They are decomposed in alcoholic solution by lead acetate and lead hydroxid. In all ways tried both deport themselves in the same way, and not inconsistent with the chemical behavior of an alkaloidal tannate.

Pure kola-tannin was also used for the preparation of the caffein salt, and yields a product identical in appearance and properties with that prepared from the impure kola-tannin of aqueous infusion of kola. But as the compound of the pure tannin does not apparently differ from the precipitate of caffein with kola infusion, the latter, less difficult of preparation, has been employed in the preparation of the several samples of caffein kola-tannate used for determining elementary composition, namely:

I. Prepared as above described. Reddish-brown powder, with astringent and bitterish taste.

II. In same way as number I, the final product being dissolved in dilute alkali solution, and reprecipitated by dilute hydrochloric acid, filtered, washed, and dried. Reddish-brown powder, with astringent and bitterish taste.

III. In the same way as number I, except that the final product was dissolved in alcohol and precipitated by ether, filtered, washed with ether, and dried. Lighter in color, but similar in taste to number I.

IV. The clear filtrate after the precipitation of number I gave, on twenty-four hours' standing, another copious precipitation of caffein kola-tannate, which was recovered in the usual way. Appearance and taste like that of number I.

The following table shows the results obtained by duplicate combustion of each of these samples for carbon, hydrogen, and nitrogen:

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\* Considerable caffein may be removed from this alkaline solution by shaking out with chloroform. It is possible that the tannate is decomposed in part or wholly by the alkali and reformed upon addition of acid. The process is wasteful, so it is likely that the re-formation, if it occurs in this way, is incomplete.

## CAFFEIN KOLATANNATE—ARTIFICIAL.

Method.....	Found.							
	I.		II.		III.		IV.	
Duplicates .....	1.	2.	1.	2.	1.	2.	1.	2.
C .....	59.27	59.41	60.11	59.89	59.64	59.35	59.94	60.22
H .....	6.21	6.02	6.18	6.07	5.96	6.10	6.08	6.24
N .....	6.20	5.96	5.30	5.54	5.61	5.45	5.15	5.27
O .....	28.32	28.61	28.41	28.50	28.79	29.10	28.83	28.27
Caffein Calculated from the N....	21.47	20.64	18.35	19.19	19.43	18.87	17.83	18.25

It will be seen by comparing these figures with those given for the natural form of combined caffein extracted from kola by physical solvents in our method, that the composition of the one does not differ very widely from that of the other, and that this artificial product has a fairly uniform and constant composition. It is of course a well-understood fact that the composition of alkaloidal tannates is by no means strictly constant, but that it varies according to temperature and concentration of solutions used, and the mass of each used with respect to that of the other. The well-known variation in the composition of the same kind of tannins, obtained under different conditions, is also to be taken into account. The natural form of combined caffein, called kolanin, yields on an average about twenty-two per cent. of caffein, while that obtained artificially gives a slightly lower amount, about nineteen per cent. being the average. The difference may, perhaps, be due to the different conditions of formation, and not to any difference in the character of the bodies themselves. And, as previously stated, so far as reactions and physical properties are concerned, leaving the slight difference in elementary composition out of consideration we have not thus far found any radical difference between the natural and the artificial products.

*Action of Ferments.*

In order to ascertain whether or not diastase would liberate caffein from this so-called glucosid, the following test was made: 0.500 Gm. of the natural caffein compound of kola, and 0.0500 Gm. of pure diastase\*, known to be 1 : 100, in 25 Cc. distilled water, were kept at a temperature of 50–53° for twenty-four hours, and for thirty-six hours at the ordinary

\* Prepared by Mr. D. L. Davoll, Jr., Instructor in Organic Chemistry in the School of Pharmacy of this University, to whom our thanks are due.

temperature ; the caffein liberated was then estimated. A control test was made at the same time, using the same amount of the caffein-bearing body, and the same volume of water, but no diastase. This was kept under exactly the same conditions of temperature and time as the first, and the caffein then estimated.

Sample with diastase yielded .0689 caffein, equal to 56.50 per cent. of the whole amount present.

Sample without diastase yielded .0706 caffein, corresponding to 58.83 per cent. of the total amount present.

This experiment was repeated on the artificial caffein kola-tannate with similar results.

These results indicate that the liberation of caffein is not due to the diastase, but to the water and heat used for its exhibition.

It was next in order to learn, if possible, the influence of the ferment of kola on the liberation of caffein from its combination existing in kola. For this purpose several perfectly fresh and sound red and white seeds were selected. One-half of the number were sliced into 60 Cc. of water and kept for sixteen hours at 50-55° and for twenty-four hours at ordinary temperature, then evaporated to dryness, powdered and the free caffein estimated in duplicates in a weighed portion. The other half of the seeds were similarly treated, except that the slices were received in boiling water to destroy the ferment, and the whole then kept at 50-55° the same length of time as those described above, then evaporated to dryness, powdered and assayed.

Sample.	Per cent. caffein.*	
	I.	II.
Not sterilized. ....	.644	.639
Sterilized .....	.629	.662

It would seem from the above stated results that the kola ferment does not assist in the liberation of caffein from its natural combination, but that such liberation as takes place is rather to be attributed to the presence of moisture and warmth.

Moreover, it is of significance respecting the caffein compound, to observe that sterilizing the kola, which checks the formation of the colored body called kola-red, does not at the same time check the liberation of the

\* Calculated for fresh seeds.

alkaloid. In other words, it does not at all appear that caffein and "kola-red" are joint products of the one hydrolysis of a glucosid, though such has been the conclusion of previous investigators.

#### ESTIMATION OF THEOBROMIN.

This alkaloid forms such a small proportion of the total alkaloids that it is usually ignored in an assay, the whole being computed as caffein. As its ratio to the caffein present seems to be pretty constant, there appears no particular objection to this procedure unless a very precise analysis is desired.

We have found the gravimetric method proposed by Kunze\*, with a few modifications, very satisfactory for the estimation of theobromin in the presence of caffein.

It is, however, necessary to purify the alkaloids by recrystallizing twice from water, or the traces of tannin and coloring matter adhering will reduce the silver nitrate and lead to erroneous results. After purification and drying at 100° C., 0.500 Gm. of the alkaloids of kola is dissolved in 25 Cc. water, a few drops of ammonia added, and then five Cc. silver nitrate solution (reagent), and the liquid heated on a water bath until the ammonia is entirely expelled. The silver-theobromin is precipitated, and collected on a weighed asbestos filter, and washed with hot water until the washings no longer show the presence of a silver salt by the addition of hydrochloric acid. Hot dilute hydrochloric acid is now passed through the filter, followed by hot water until the washings are free from all traces of hydrochloric acid. The silver chlorid remaining in the filter is now washed successively with alcohol and ether, dried twenty minutes at 85-100° C. and the tube weighed. From the weight of the silver chlorid we have the proportion :

Mol. Wt. of AgCl : Mol. Wt. of  $C_7H_8N_4O_2$  :: Wt. of AgCl : x = Wt. of theobromin.

In total free alkaloids the proportion of theobromin was found to be 1.48 per cent., and in total combined alkaloids, as would be expected, very nearly the same, in this case 1.51 per cent. Schweitzer,† however, found that it constituted 19.70 per cent. of the total combined alkaloids, and suggested that the increased amount of theobromin may be due to its formation from caffein by the prolonged boiling with the five per cent. sulfuric acid used by him for hydrolysis of the supposed glucosid.

But as a matter of fact, a methyl group is not so easily eliminated from caffein. That five per cent. sulfuric acid will not effect this change is shown by the results of the experiment next described. 0.3494 Gm. of caffein boiled for six hours with twenty-five Cc., five per cent. sulfuric acid

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\* W. E. KUNZE, 1894, *Zeitsch f. Anal. Chem.* p. 24.

† 1895: *Inaugural Dissertation*, Univ. Munich.

showed at the end of that time not the slightest trace of theobromin by the silver nitrate test previously mentioned, and 0.3485 Gm. was recovered. Nor is caffein changed or colored by concentrated sulfuric acid even at 100° C.\*

Schmidt† found that by heating caffein with concentrated hydrochloric acid in a sealed tube for six to twelve hours, at 250° C., ammonia, sarcosin, methylamin, carbon dioxid and traces of formic acid were formed, but no theobromin; he also found that concentrated hydrochloric acid has no action on caffein below 200°.

#### *Melting Point of the Alkaloids.*

After repeated purification, the melting point of the mixed free alkaloids of kola was taken, as was also that of the combined alkaloids; both were the same, 225°–227°, corresponding fairly well with that of pure caffein.

#### TANNIN.

##### (1) *Free Tannin.*

This was separated in various ways, the preferred method being as follows, taken in part from Allen:‡ The drug is exhausted with 95 per cent. alcohol, the alcoholic solution distilled in vacuo to a syrupy consistence, then washed with cold water. The insoluble matter is removed by decantation or filtration, and the clear wine-red solution fractionally precipitated with lead acetate (or lead hydroxid), the first and last portions of lead tannate being rejected. The lead tannate after being well washed is suspended in alcohol and decomposed with hydrogen sulfid. After filtration the alcoholic solution of tannin is distilled in vacuo to syrupy consistence and evaporation finished in a vacuum desiccator over sulfuric acid.

The tannin thus obtained is light-red to red-brown, having a faintly acidulous and decidedly astringent taste; deports itself as other tannins do towards iron salts ("iron-greening"), gelatin, alkaloids, etc., etc. It is a glucosidal body, yielding on hydrolysis with mineral acids a dark brown body. This was found to be insoluble in water or alcohol, and to give, on combustion, 69.20 per cent. of carbon, and 6.70 per cent. of hydrogen;§ with the dark brown body was obtained glucose, identified by its action on Fehling's solution, and toward phenylhydrazin, with which latter it forms an osazone. We did not obtain a sufficient quantity of this osazone to take its melting point, but its presence gave evidence of the glucosidal nature of the tannin.

\* Prescott's Org. Analysis, p. 82. Allen's Com. Org. Analysis, vol. iii., pt. ii., 478.

† E. SCHMIDT, *Annalen*, 217, 270.

‡ Allen's Com. Org. Analysis, iii., pt. i., p. 76.

§ These figures do not correspond with those given by Knebel for kola red,  $C_{14}H_{12}(OH)_6$ .

(2) *Combined Tannin.*

The tannin existing in kola in combination with the caffeine (as the so-called glucosid) was separated by means of lead hydroxid, following the above-described manipulations. This "combined" tannin agrees in appearance and properties with the free tannin already described, being also a glucosid tannin.

The results obtained by combustion are also stated next below :

Duplicates.	" Free " tannin.		" Combined " tannin.	
	I.	II.	I.	II.
C .....	53.36	53.57	55.61	55.78
H .....	5.19	5.28	5.37	5.54
O .....	41.45	41.15	39.02	38.68

All calculations upon the composition of this body are reserved until after further work in its separation.

*Ann Arbor, Mich., July 6, 1896.*

Prof. Sayre read the following paper on Taraxacin :

## TARAXACIN.

BY L. E. SAYRE,

*Member of Research Committee of the American Pharmaceutical Association.*

Continuing the investigation recorded in the preceding volumes of this Association, '93, '94, and '95, I have this year devoted my time specially to the study of the bitter principle taraxacin. In a former paper it was stated that the difficulty in isolating the active principle lay in the separation of it from the extraneous matter with which it seemed to be always contaminated. It was stated that all attempts to obtain the bitter principle in a crystalline form, free from admixture with the brownish red extractive, had been unsuccessful, and it was my opinion that all former reports of taraxacin in analyses were only the crude bitter principle containing this extractive. The colorless solutions of the principle on evaporation separate resin-like globules at first, which when evaporated to the solid condition now and then show needle-like crystals, intermingled with the above-mentioned extraneous matter. (?) Whether these crystals, or uncrystallizable amorphous globules, were actually the bitter principle

was a question. This problem has been one with which I have wrestled during the past year.

Before stating the results of this work it may be well to go briefly into the history of the principle itself. In 1839 an article appeared by Gustav Polex\* "Ueber das Löwenzahnbitter" (Taraxacin) in *Archiv. der Pharmacie*, Second Series, Vol. xx., page 50, in which he states that he obtained the bitter principle in crystalline form by extracting the milky juice in distilled water. By this means the albuminous substances were coagulated, carrying with them the resin, fatty matter and caoutchouc, filtering the concentrated liquor, and allowing it to evaporate spontaneously in a warm place. The crude crystals were re-crystallized from alcohol or water. It would form thus arborescent or star-shaped crystals. These were reported as melting readily, non-volatile, having a bitter and rather acrid taste, sparingly soluble in cold water, readily soluble in boiling water, alcohol and ether, soluble in concentrated acids without decomposition; containing no nitrogen. He classed it with the neutral principles.

I have gone over the ground of Polex myself, and have concluded, as did Kromayer, in 1861, that the crystals obtained by Polex did not represent the bitter principle. My opinion is that they were a mixture of various substances, included in which was the Taraxacerin of Kromayer, of which I will speak later. The arborescent and stellate forms from the milky juice of Polex have been obtained, but on purification of these I have found that the bitter substance separated from them is not crystalline, leaving behind material which is to some extent inorganic. Kromayer, in *Archiv. der Pharmacie*, 1861, p. 6, 105 and 106, second series, is quoted by the editor of that journal, L. F. Bley, as having been unsuccessful in obtaining the bitter principle. He seems to have gone over Polex's work.

Abstracting this article† the editor says: "Fresh root gave upon treat-

\* Gustav Polex appears to have been one of the early pioneers in Plant Chemistry. He published articles about the year 1839, as below tabulated:

Berberin, *Archiv. der Pharm.*, Second Series, Vol. vi., p. 265-281.

Cheledonin and Pyrrhopin, *Archiv. der Pharm.*, Second Series, Vol. xvi., p. 77.

Ligustrin, *Archiv. der Pharm.*, Second Series, Vol. xvii., p. 75.

Cicutin, *Archiv. der Pharm.*, Second Series, Vol. xviii., p. 174.

Taraxacin, *Archiv. der Pharm.*, Second Series, Vol. xx., p. 50.

Most of the books refer to this and Kromayer's work somewhat confusedly.

† Kromayer's fullest publication on taraxacum is found in the publication of a monograph on a prize subject under the German Apothecaries' Union, of which *Archiv. Pharm.* is the organ. This prize research was upon bitter principles at large—the monograph was purchased by Dr. Prescott; from this I make the following translation on taraxacin: "I tried to separate the taraxacin from the root and the fresh milky juice, but secured it only as an amorphous principle. The milky juice has a neutral reaction in its fresh condition, but assumes soon an acid character, while it stiffens to a friable mass, which soon turns brown (Leontodonium). In this respect it shows much similarity to



ment with water fermentable sugar and inulin. In the same were found chiefly sodium chloride and potassium nitrate. From both with mixed extract crystallizations were obtained which represented apparently Polex's Taraxacin, although the isolation of it did not succeed. One experiment to separate the milky juice from the fresh roots gave only 9 grammes yield. The dried juice had an acid reaction, while the milky juice upon separation was neutral. The author calls this leontodonium. It was dissolved in water, treated with animal charcoal, and this taken up with alcohol. The same evaporated contained crystals; was dissolved in water and precipitated with lead subacetate. The precipitate gave upon decomposition only a flat tasting syrup. From the principle leontodonium, insoluble in water, a bitter solution was obtained with alcohol, which upon concentration separated round, tasteless kernels, showing these free from nitrogen. The ultimate analysis gave C 74.444; H 12.686; O 12.870. Kromayer calls this material taraxacerin." This would seem to be a poor representation of Kromayer's work (see foot note). Looking over the current publications, text-books, etc., I find that published statements of taraxacin rest upon the actual work of Polex in 1839, and upon a confusion between taraxacin, bitter, and taraxacerin, tasteless, of Kromayer. Not unfrequently do we see attached to the term taraxacin the statement of its ultimate composition, as, in a text-book on pharmacy, which is very frequently consulted, the statement is made that "taraxacum owes its bitterness to taraxacin,  $C_8H_{16}O$ ." Now, the fact is, there has never been a combustion made of this principle, and it is a question in my mind whether the principle has ever been crystallized. Those who will take the trouble to go over the literature, a bibliography of which is appended hereto, will, I think, agree with me in this statement.

It remains for me to state the work of the past year upon this subject in my own laboratory, the results of which, I am pleased to state, seem to be quite promising. Fifty pounds of drug were extracted with chloroform, the chloroform allowed to evaporate spontaneously until a solid or semi-

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the milky juice of *Lactuca* varieties, and contains also a body (similar to the lactucerin) taraxacerin. \* \* \* \* According to my researches on taraxacin the freshly collected leontodonium is repeatedly extracted with hot water till the remainder no longer tastes bitter. The collected washings are treated with animal charcoal, and from the latter the bitter principle is extracted with alcohol. The alcoholic solution is distilled and the residue is precipitated with lead subacetate, and the lead removed by  $H_2S$ , and evaporated on a water bath. The colorless very bitter mass which remains is treated with ether, whereby an acid resin is dissolved. The insoluble portion presents a colorless very bitter amorphous mass, which in its property corresponds to the taraxacin of Polex. The part of leontodonium insoluble in water is almost completely soluble in strong boiling alcohol. Upon long evaporation of the alcoholic solution warty aggregations of taraxacerin are separated, which upon repeated solution in alcohol, and slow evaporation can be secured dazzlingly white. Dried at  $100^{\circ}C$ , it corresponds to the formula  $G_{40}H_{40}O_3$ ."—August Kromayer, *Die Bitterstoffe und Kratzend-Schmeckenden Substanzen*, 1861.

solid extract was left behind. Small portions of this extractive were taken and several rather unsystematic analyses were made. Data of all the work was carefully recorded, all new developments were carefully studied, in order that a process might be reached for the isolation of the active principle. By the time an amount of fluid representing 25 lbs. was exhausted, sufficient data had been collected to conduct an analysis in a satisfactory manner. The chloroformic extract was macerated for several days in 500 Cc. of alcohol, with occasional agitation. The liquid was then decanted, and the residue marked "A" washed with alcohol until free from bitterness. The alcoholic solution was then evaporated (distilled) to about 100 Cc., and an equal volume of water gradually added, care being taken to avoid emulsifying the resin contained in the alcoholic solution. This treatment precipitated most of the resinous matter soluble in alcohol, which gathered in a soft, waxy mass at the bottom of the vessel. The supernatant liquid was then decanted and the residue marked "B" was digested with successive portions of hot water until free from bitterness. These resins "A" and "B" with the bitter principle correspond to what Kromayer in 1861 called *leontodonium*.

The aqueous solution was evaporated to about 100 Cc., thus driving off all the alcohol and allowing the resinoid matter held in solution to deposit. The aqueous solution was then shaken with ether to remove all traces of resinoid matter. The ethereal washing, evaporated and redissolved in water, gave a very bitter solution, showing that the bitter principle adhered tenaciously to the resinous matter. The aqueous solution was evaporated to a solid, dissolved in alcohol, the alcoholic solution evaporated to a solid, the alcoholic extract dissolved in distilled water, again evaporated, again treated with alcohol, and in this way all proteid matter seemed to be gotten rid of. The aqueous extractive thus obtained represented the bitter principle; this was soluble in cold water, very soluble in hot water, in alcohol, ether and chloroform, giving with water a straw-colored solution, which was intensely bitter. From the aqueous, alcoholic, ethereal and chloroformic solutions an attempt was made to crystallize the principle by spontaneous evaporation, evaporating in vacuo, etc., but all attempts at crystallization were unavailing. It was noticeable, however, that the gummy extractive which when allowed to deposit in thin film on crystallizing dishes, showed under the microscope here and there acicular crystals of arborescent and stellate forms. How to account for these it seemed impossible; a theory suggested itself that it might be due to ammonium chloride from the laboratory fumes, which were absorbed in the aqueous solutions in some way. But on further examination this was proved not to be the case. Finally, after a number of unsuccessful experiments upon this subject, it occurred that these crystals might be due to a process of oxidation. The gummy, bitter, uncrystallizable substance was then dissolved in peroxide of hydrogen and

allowed to evaporate. Upon examining the extractive from the evaporation of this solution, it was found that the number of crystals had increased enormously, but that not all the extractive had been converted into crystals. The residue was repeatedly dissolved in peroxide of hydrogen, and by this process the whole mass was converted into crystalline form. Another portion of extractive was dissolved in diluted nitric acid, and on evaporation of this solution, a solid mass of crystals, free from extractive matter, was obtained. As a name for this derivative of taraxacin, I at that time believed taraxacic acid would be appropriate. Quite a quantity of this was made and some of it very pure and white. The method used was as follows: The impure bitter substance was heated on a water-bath with dilute nitric acid for some hours, the solution evaporated and water added; the acid solution filtered and to it lead acetate was added, which precipitated the acid as a very insoluble lead salt. After washing this salt with distilled water, it was suspended in distilled water and treated with  $H_2S$ . The filtered solution was then evaporated. The acid then crystallizes out in long, white needles, or in short prisms.

It was believed then that this result of forming an acid from bitter principle by oxidation, indicated an easy practical method of standardizing taraxacum root; the process being to convert the bitter principle into the acid and weigh it as a lead salt. But, to my disappointment, on further studying this acid, by observing its crystalline form, solubility in different solvents, by its behavior when heated to determine its melting point, by sublimation, etc.—to my disappointment this crystalline substance was thus identified as oxalic acid—the oxidation product of so many organic compounds. Whether any of the salts of this acid—obtaining it by the oxidation of taraxacin—could be used as means of assaying the drug or not depends on whether or not there is anything else in this extractive, called taraxacin, which will yield oxalic acid when oxidized, and whether the ratio of bitter principle to acid is constant. These things can only be determined by experiment, but of success in this direction I have little hope, because of the many chances of error involved. Of course, if we have found that the crystalline oxidation product is oxalic acid, we would use the calcium salt instead of the lead for its estimation.

It was stated by Pollex and by Kromayer that the bitter principle of taraxacin was wholly indifferent to chemical reagents. I have found the bitter principle to be quite different from this in characteristic. It is extremely sensitive to all the alkaloidal reagents; phosphomolybdic, and phosphotungstic acids, platinic chloride, gold chloride, tannic acid, etc. On precipitating a solution of the bitter principle with phosphomolybdic acid and treating the precipitate according to Scheibler's process, namely, by treating the precipitate with barium hydrate, drying it upon the water-bath and then extracting it with chloroform or alcohol, I recovered the same bitter principle unchanged. On evaporating the super-

natant liquid, first neutralizing the solution by ammonium hydrate and then by sodium bicarbonate, drying the residue, and extracting it by means of chloroform, I recovered another quite large portion of the same bitter principle. From this experiment it would seem that phosphomolybdic acid unites with the bitter principle, forming a compound which is sparingly soluble. On heating the bitter principle with water acidulated with hydrochloric acid for some time it gives at the end of a few hours a decided reaction with Fehling's solution, but I do not state this as a conclusive evidence of its being a glucoside. On passing ammonia gas into a chloroformic solution of the bitter principle it had the effect, after the gas had passed through a few minutes, of separating a dark colored fluid, which floated on top of the chloroform. This dissolved very easily in water, giving a very beautiful rose-red solution with a slight fluorescence. The water solution gave a slight turbidity on treatment with HCl, and this is soluble in alcohol. Before treatment with  $\text{NH}_3$ , the bitter principle is very soluble in chloroform and not very soluble in water; after treatment the solubility is reversed. As to the other constituents of taraxacum, there have been separated two distinct resins, one soluble in chloroform and insoluble in alcohol; another soluble in 80 per cent. alcohol. The latter resin when slowly evaporated from alcoholic solution separates from it in white, cauliflower-like forms. These two resins are now under examination, and it is to be hoped that by the time the Proceedings of this Association are published more definite statements concerning their ultimate composition, as well as the composition of taraxacin, will be made.

For next year's work I propose to go over the ground, and am negotiating for the preparation of a chloroformic extract of 100 lbs. of drug, as a starting point for further investigation. I should state before closing that the resins, above mentioned, when purified and boiled with nitric acid do not yield even a trace of crystals on evaporation. The resins are oxidized to yellow substances, which are only slightly soluble in water; soluble in alcohol. The aqueous alcoholic solutions are colored intensely red by ammonia. These are nitro-compounds, undoubtedly; the amido-compounds by reduction with alcoholic ammonium sulphide are being investigated.

For aid in this work I wish to express my indebtedness especially to Mr. H. P. Cady, Lawrence, Kans., assistant in chemistry. Also to Prof. A. B. Prescott, for his valuable assistance in collecting the bibliography of the subject, which is tabulated below.

*Polex*, 1839: Taraxacin, isolation and crystallization of. *Archiv. Pharm.*, (2), 20, 50.

*Hahn*, 1839: Extract of taraxacum. *London Medical Gazette*.

—— 1839: Extract of taraxacum. *Archiv. Pharm.*, (2), 19, 78.

*Squire*, 1839: Finds crystallization substance soluble in water and alcohol. *Brande's Wörterbuch der Arzneimittellehre*.

—— 1839: Finds as above. *Archiv. Pharm.*, (2), 19, 80.

*Büchner*, ? : *Archiv. Pharm.*, 24, 298.

- Frickhinger*, 1840: Buchn. Reporter f. d. Pharm., 68, 45.  
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 — 1861: Was not able to (?) isolate taraxacin, but isolated taraxacerin, and gave its analysis. Archiv. Pharm., (2), 105, 6.  
*Schweitzer*, 1861: Preparation of extract. Chem. News, 2, 64.  
 — 1861: Preparation of extract. Archiv. Pharm., (2), 105, 380.  
*Vohl*, 1864: Pectone, intercellular substance. J. prakt. Chem., 91, 96.  
*Symes*, 1879: Changes in bitter principle due to frost. Pharm. Jour. Trans., (3), 10, 361.  
 — 1879: Changes as above. Am. J. Pharm., 51, 619.  
*Barnes*, 1880: Hygroscopic solid extract. Pharm. Jour. Trans., (3), 10, 849.  
 — 1860: Hygroscopic as above. Year-Book of Pharmacy, 277.  
*Koch*, 1892: Analysis of root. Am. J. Pharm., 64, 65.  
*Sayre*, 1893: Composition of root at various seasons; methods of examination; tables of analyses. Am. Phar. Assoc., (Proc.), 41, 77.  
 — 1894: Upland and lowland roots; analysis before and after drying. Am. Phar. Assoc., (Proc.), 42, 241.  
 — 1895: Coloring matter; acrid principle; taraxacin. Am. J. Pharm., 67, 465.  
*Dragendorff*, Pflanzen und Pflanzentheile, 155.  
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At 11 P. M. the Section adjourned, to meet again at 9 o'clock on Saturday morning.

### THIRD SESSION—SATURDAY, AUGUST 15, 1896.

The Section was called to order at 10 a. m. by the Chairman, Prof. S. P. Sadtler.

On motion of Dr. Whelpley, the reading of the minutes of the second session was dispensed with.

The reading of papers having been ordered, Mr. Kebler read the following:

## POISONOUS HONEY.

BY LYMAN F. KEBLER, PH. C., B. S.

In the nice bee what sense so subtly true,  
From poisonous herbs extracts the healing dew!—*Pope.*

Some of the members of the Philadelphia Beekeepers' Association were not a little agitated concerning the report of a case of poisoning by honey, occurring last fall at Princeton, N. J. Through the efforts of one of the members, the writer had placed at his disposal several sections of this honey for examination. The importance of this subject is sufficient reason for giving a somewhat detailed review of it.

It has been known many years that honey produced by bees having access to certain Ericaceæ, growing in various districts, acts as a narcotico-irritant, producing giddiness, vomiting and purging. The first record of the effect of poisonous honey occurs in Xenophon's\* account of the "Expedition of Cyrus," popularly known as "The Retreat of the Ten Thousand." Having ascended the mountains of the Colchians, and put to rout the inhabitants, the Greeks encamped in their villages. "There † was nothing at which they were surprised; but the number of bee-hives was extraordinary, and all the soldiers that ate of the combs, lost their senses, vomited, and were affected with purging, and none of them were able to stand upright; such as had eaten only a little were like men greatly intoxicated, and such as had eaten much were like mad-men, and some like persons at the point of death. They lay upon the ground, in consequence, in great numbers, as if there had been a defeat; and there was a general dejection. The next day no one of them was found dead; and they recovered their senses about the same hour that they had lost them on the preceding day; and on the third and fourth days they got up as if after having taken a physic."

Strabo, ‡ the ancient historian, relates that three squadrons of Pompey's troops were destroyed by the Heptacometæ, a wild tribe inhabiting the mountains east of Themiscyra. The soldiers were tempted with the luscious poisonous honey, and while under its influence were slain.

Dioscorides,§ Diodorus Siculus || and Aristotle all mention the maddening effect produced by honey of Heraclea Pontica gathered in certain seasons of the year.

C. Pliny¶ noticed not only poisonous honey, but maddening honey

\* 400 B. C. Xenophon, *Anabasis*, Bk. 4, C. 8, §§ 20-21.

† Rev. J. S. Watson's Translation of the *Anabasis*.

‡ 100 B. C. Lib. 12, page 826.

§ Lib. 2, page 103.

|| 40 B. C. Lib. 14.

¶ 77 B. C. *Natural History*, Bk. 21, C. 44 and 45.

also. He writes thus: "Indeed, the food of bees is of the very greatest importance, as it is owing to this that we meet with poisonous honey even. At Heraclæa, in Pontus, the honey is extremely pernicious in certain years, though it is the same bees that make it at other times. There is a certain plant, which from the circumstances that it proves fatal to beasts of burden, and to goats in particular, has obtained the name of *ægolethron* (Goats' death), and the blossoms of which, steeped in the rains of a wet spring, contract most noxious properties. The following are the signs of honey being poisonous: It never thickens, the color is redder than usual, and emits a peculiar smell, which immediately produces sneezing," and is more weighty than good honey. Persons eating it throw themselves on the ground to cool: their bodies being covered with perspiration. Beekeepers to-day say that heather honey has a higher specific gravity than any other.

"Maddening Honey." In the country of Sanni, in the same part of Pontus, a honey is met with that produces madness, and has received the appellation "*mænomenon*." This contamination is generally attributed to the flowers of the *Rhododendron*, with which the woods there abound. "In Persis, too, and in *Gætulia*, a district of *Mauritania Cæsariensis*, bordering on the country of *Massæsyli*, there are poisonous honey-combs found; and some, too, only partly so, one of the most insidious things that could happen, were it not that the livid color of the honey gives timely notice of its noxious qualities."

J. P. Tournefort \* ascribes the source of poisonous honey to *Chamæ-rhododendros Pontica*, *maxima* (*Azalea pontica*). He says the honey stupefies the persons who eat of it.

Mr. Peysonnell † mentions among the annual exports from *Taman*, 25 tons of honey collected in *Abaza*, near the Black Sea. This product was exported as mad honey (*mi-l-fol*), and was used as an ingredient of intoxicating drinks to increase their effect.

Poisonous honey thus far considered has had its origin principally in Asia Minor. But our own United States have not escaped. Indeed, it appears that cases of poisoning multiply as bee-culture develops. No less than eight cases have been reported in New Jersey alone during the past year. B. S. Barton ‡ was the first to investigate the subject in this country, and his interesting and exhaustive communication was read before the American Philosophical Society in 1794, but it was not published until 1802. Poisonous honey coming from western Pennsylvania he describes

\* 1704, *Hist. de l'Acad. Roy. des Science*, Paris, 19, 348; 1717, *Letters from the Levant*, 2, 228.

† 1787, *Treatise on the Commerce of the Black Sea*.

‡ 1802, *Trans. Am. Phil. Soc.*, 5, 51; *Foderé*, 4, 90; *Beck's Medic. Jurisprudence*, 2, 720.

as producing dimness of sight, vertigo, succeeded by delirium, sometimes mild and pleasant, then again ferocious, producing ebriety, pain in the stomach and intestines, profuse perspiration, foaming at the mouth, vomiting and purging. The same authority also relates that a party of Pennsylvania adventurers placed some hives into New Jersey in order to produce honey. The bees thrived splendidly and gathered an abundance of honey, but unfortunately, it was of a very pernicious character. Not willing to be shorn of the fruits of their labor, these adventurers converted their deleterious honey into a drink called "metheglin," which, contrary to their expectations, was also very intoxicating.

Dr. I. B. Coleman\* reported a case of wholesale poisoning by honey occurring in New Jersey. Fourteen persons were affected, consisting of men, women and children. One died, six were severely afflicted, and the rest only slightly incommoded. There was burning of the stomach and skin, shivering, general sense of coldness, retching, and ineffectual efforts to vomit.

Undoubtedly, much poisonous honey has been produced in this country, and many persons affected by it, of which we have no record. Excepting the above and some poisonous honey met with by the soldiers of the rebellion, through the Southern States, no record of any has been made in this country until we met with the celebrated case of poisoning† at Branchville, S. C. Here twenty persons were affected, three of whom died. The honey was found to be highly impregnated with gelsemine. Historically, this brings us to the case of poisoning at Princeton, N. J.

The sections of comb-honey in the writer's hands were carefully examined externally, and found to possess a normal physical appearance. One section would not have aroused the least suspicion in odor, color, or taste; but another section was quite dark, reddish-brown, possessed a nauseating odor, and a pungent, burning taste in the back of the mouth and throat, in a measure resembling the first sensations of aconite. A number of persons were invited to take a little of the honey, its character being unknown to them; all immediately began to cough, and question the quality of the product. A third section was entirely eaten by the writer and another person in a day and a half with no ill effects. A small portion of one side of the comb possessed a most pleasant flavor, while the remainder faintly resembled section two above. The producer was not certain that all of the honey delivered to the writer was poisonous.

The contents of the non-suspicious section, about 360 Gms. were digested with absolute alcohol, at the temperature of the room, during two days, with frequent agitation. The alcohol was then decanted, evaporated

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\* 1852, N. J. Medical Report, Burlington, 6, 46.

† Gaillard's Med. Jour., 41, 107; London Lancet, 307; Pharm. J. Trans., (3), 16, 188.



at the ordinary temperature, and the alcoholic residue again treated with absolute alcohol as before. The alcoholic solution was again decanted, evaporated, and a portion of the extractive administered to two cats. One cat was given a small dose, while the other received a large dose. The small dose produced partial exhaustion, relaxation of the voluntary muscles and general depression. The large dose in a short time produced restlessness, vomiting, purging, prostration, and almost complete loss of the voluntary muscles, showing that the honey contained a prompt and potent poison. The animal could scarcely be induced to move, and when motion was attempted, first the fore-limbs would fail, and then the back limbs would give way. First one portion of the body would sway in one direction, then the other portion in another, reminding one of a highly intoxicated person. Had the entire dose been retained, death undoubtedly would have followed. As it was, the cat had regained her normal condition only at the end of twenty-four hours.

The physician who attended the persons afflicted with similar honey writes as follows: "Only two persons partook of the honey; all the rest of the family and the servants ate of each of the other articles served at breakfast, and were not in the least affected. Mr. and Mrs. Chambers took but a small quantity, yet each noticed a peculiar, pungent, burning taste in the comb as soon as it had passed their lips. In fifteen or twenty minutes afterwards, Mrs. C. was taken with nausea, abdominal pain, and vomiting, soon followed by loss of consciousness, coldness of extremities feebly acting heart, and complete collapse. While ministering to her, Mr. Chambers, who had also experienced the initiatory symptoms of pain and nausea, suddenly exclaimed, 'I cannot see,' and soon sank in a state of syncope to the floor. In each case the symptoms were similar. Retching, vomiting, purging, acute gastric and abdominal pain, and continued cramps for some hours, with surface coldness, and deadly pallor, and the general symptoms of collapse. No pulse could be detected at Mr. C.'s wrist for two hours, and the heart-sounds were extremely feeble and irregular: as they also were in Mrs. C.. Though her pulse was not entirely lost, yet for an hour it was scarcely discernible. By the aid of restoratives, consciousness returned to Mrs. C. in about three hours, but the husband was not fully himself for nineteen hours—till four o'clock the next morning, and had no recollection of anything that had transpired in the interim, although he had conversed with the nurse and myself during the afternoon and night.

"The treatment consisted of brandy and hot drinks, sinapisms, external application of heat, hypodermic injection of morphine, for pain, and of digitaline, until reaction was restored. Then rest, quiet and a general supporting plan was adopted. Recovery took place gradually and without any eventful symptoms, though the restoration to strength was very slow."

The honey was next carefully examined for alkaloids, with negative re-

sults in every case. Not a trace of either an alkaloid or any inorganic poison could be detected.

The remainder of the alcoholic extractive was farther purified and finally taken up with alcohol, agitated with light petroleum ether, then with chloroform, and the tests applied to the chloroformic residue. The above procedure is an adaptation of Dragendorff's process. Plugge \* says the reactions of andromedotoxin with dilute and concentrated mineral acids are characteristic, yielding intensely red decomposition products. Concentrated sulphuric acid produces a dark reddish-brown, becoming redder on warming, and turning light mulberry-red on diluting with water. Alkalies destroy the color, which re-appears on acidifying. These distinctive chemical tests were not sufficiently sharp and characteristic to justify a positive conclusion either for the presence or the absence of this poison. Further work will be done in this direction.

Prof. Plugge † has found andromedotoxin in *Andromeda japonica*, Thunb., *A. polifolia*, L., *A. Catesbæi*, Walt., *A. calyculata*, L., *Kalmia latifolia*, L., *Monotropa uniflora*, L., *Pieris formosa*, Don., *P. ovalifolia*, Don., *Rhododendron Falkoneri*, Hook., *R. grande*, Wright, *R. barbatum*, Wallich, *R. fulgens*, Hook., *R. cinnabar*, Roxb., and *R. punicum*, Smith.

Mr. Bartram has traced many deaths to honey coming from *Kalmia latifolia*. Seringe relates that two Swiss priests were poisoned by eating honey gathered from *Aconite dycoctonum* and *A. napellus*, but others hold that the bee's tongue is too short to gather nectar from these plants. C. G. B. Daubney ‡ states positively that *Rhododendron ponticum* is harmless, but has suffered much in connection with *Kalmia latifolia*, and Messrs. Dod and Nesbitt question the oft-repeated assertion that poisonous honey is obtained from it; but according to the statements of Messrs. Webber, Clarke and Ross, there can be little question about this plant being poisonous. All are agreed that *Azalea pontica* furnishes poisonous nectar; even the natives of Turkey believe that their "Delli Bal," or mad honey, has its origin in the azalea.

Robert Moffat § reports that a species of *Euphorbia* of South Africa produces poisonous honey. Mr. Hicks, || of Long Island, claims that *Andromeda Mariana* is the source of pernicious honey. He also says that some paper related the fact that a Philadelphia chemist had examined some honey from this source and found it to contain prussic acid.

After reading the above reports of poisonous honey, little doubt can exist in the mind of any one as to its origin. Yet some believe that honey is

\* 1889, Arch. d. Pharm., 227, 164; Am. J. Pharm., 61, 360; J. Chem. Soc., 56, 278.

† 1891, Arch. d. Pharm., 229, 552; Am. J. Pharm., 63, 603.

‡ Lecture on the Trees and the Shrubs of the Ancients. Lecture 4, p. 105.

§ 1846: Missionary Labors, page 32.

1896: Meehan's Monthly, 6, 123.

rendered noxious after being accumulated. This might be true in the case where an analysis\* of the honey revealed the presence of arsenic. How it found its way there is a problem, for this chemical is a powerful insecticide. The honey was collected near an arsenical factory, and it is not improbable that the arsenic found its way into the honey mechanically. Being sparingly soluble, it is not impossible for it to happen in this manner during a dry atmosphere.

When the poison is an alkaloid, as gelsemine, the problem is easily solved. The bees simply collected nectar from certain narcotic plants. But some one argues that it is impossible for these little creatures to collect and store a poison and not be killed themselves. There is scarcely a narcotic herb that does not give support to some form of animal life. What is nourishment and life to one is poison and death to another. Many of General Braddock's horses perished from eating leaves of the laurel during the month of June, 1755, a few days before his defeat, yet pheasants will eat and thrive on the buds and leaves of the *kalmia latifolia* in times of scarcity; but their flesh becomes so permeated with the poisonous principle that persons have frequently been poisoned by eating it. Such a large number of cases of poisoning from this source at one time occurred in Philadelphia that the mayor was compelled to act, by prohibiting the use of pheasants as food. Again, who can positively state that the mortality of bees is not increased in poisonous pasturage?

Is it possible to detect the unwholesome from the wholesome by odor, color and taste? The writer's experience is that one sample can be detected while another cannot be detected. C. Linnæus informs us that the honey gathered from the *Ericaceæ* possesses a reddish color, but does not say anything about noxious properties. Great quantities of "blooming heather" honey are consumed in Scotland, but no record exists of its being poisonous. The most experienced hunters of Colonial days, of North America, were able to distinguish the pernicious from the innocent by its crimson or reddish-brown color and thicker consistency. W. Bartram says that the poisonous honey of the Carolinas and the Floridas is so similar in color, odor and taste that it cannot be distinguished from the wholesome. The hunters tested it by taking a little and watching its effect.

Since Messrs. Plugge and de Zaayer have made their extensive examinations of the *Ericaceæ*, some of which abound almost everywhere in the temperate climates, and found the potent poison, Andromedotoxin, in so many of them, even the most conservative must admit that if the pasture of the bees abounds in any of these plants, poisonous honey is an inevitable consequence in certain portions of the year.

Physiologically, the chain of evidence has not been absolutely estab-

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\* 1871, M. Bouchardat, *Ann. d. Therap.*, 34, 207; *A Treatise on Poisons* (Taylor), third ed., p. 174.

lished, some one says. It is true that the andromedotoxin obtained from certain of the Ericaceæ produced some symptoms that have not been satisfactorily observed when the poison was extracted from the honey. But noted, and it will be only a question of a few years when there cannot be most of them have been a shadow of a doubt.

In placing an apiary, great care should be exercised in selecting a locality. Where many of the Ericaceæ abound, as in certain parts of New Jersey, the bee-keeper is warned not to place his hives, even though it appears to be an ideal spot otherwise. The dealer is also cautioned to investigate with great care the source of this article, in order to avoid unpleasant popularity.

ADDITIONAL LITERATURE ON POISONOUS HONEY, NOT REFERRED TO IN THE BODY OF THE ARTICLE.

- 1791, J. Bruce. *Travels to Discover the Source of the Nile*. Vol. 5.; or Appendix, Quarto Ed., p. 151.  
 1799, W. Curtis. *Botanical Mag.*, 13, 433.  
 1819, Schrank. *Med.-chir. Ztg.* Salzbg., 1, 316.  
 1822, W. Kirby and W. Spence. *Edinburg Review*, 37, 122.  
 1824, *Mémoires du Muséum*, 11, 313.  
 1825, A. de Saint-Hilaire, *Mémoires du Muséum*, 12, 293.  
 1830, J. Lindley. *Natural System of Botany*. 1st Ed., p. 183; 2d Ed., p. 221; Amer. Ed., p. 180.  
 1834, K. E. Abbot. *Phil. Mag.* (3), 5, 313.  
 1842, W. J. Hamilton. *Researches in Asia Minor*. 1, 160, and 2, 283.  
 1855, J. D. Hooker. *Himalayan Journal*, 1, 190.  
 1861, G. Bidie. *Madras Quart. Jour. Med. Sci.*, 3, 399.  
 1873, Le Maout, Decaisne and J. D. Hooker. *System of Botany*, p. 517.  
 1875, J. Gammer, *Gleanings in Bee Culture*, Feb.; *A B C of Bee Culture*, by A. I. Root, p. 163.  
 1877, *Pharm. J. Trans.* (3), 8, 184; *Proc. Am. Pharm. Assoc.*, 26, 529.  
 1879, A. Biliotti, *Consul at Trebizonde*, Report of, 2331, p. 1023.  
 1881, *Encyclop. Brit.*, 9th Ed., vol. 12, p. 136.  
 1883, P. C. Plugge, *Arch. d. Pharm.*, 221, and 813; *Am. J. Pharm.*, 55, 196.  
 1883, A. Nesbitt, *Gardeners' Chronicle* (2), 20, 763; *Pharm. J. Trans.* (3), 14, 504.  
 1883, C. W. Dod, " " (2), 20, 793; " " " "  
 1883, H. Clarke, " " (2), 20, 819.  
 1883, H. J. Ross, " " (2), 20, 821.  
 1885, P. C. Plugge, *Arch. d. Pharm.*, 223, 905.  
 1885, H. Bley, *Pharm. Ztg.*, 30, Nov. 25; *Pharm. J. Trans.* (3), 16, 448.  
 1886, H. G. de Zaayer, *Ouderzoekingen over Andromedotoxine*, Dissert. Groningen.  
 1887, P. C. Plugge and H. G. de Zaayer, *Pflüger's Arch. f. Physiol.*, 40, 480.  
 1887, J. C. Thresh, *Pharm. J. Trans.* (3), 18, 397; *Proc. Am. Pharm. Assoc.*, 36, 411.  
 1887, H. J. Ross, *Gardeners' Chronicle* (2), Dec. 17, 748; *Pharm. J. Trans.* (3), 18, 540.  
 1887, T. L. Brunton, *Pharm. J. Trans.* (3), 18, 475.  
 1891, P. C. Plugge, *Arch. d. Pharm.*, 229, 554; *Chem. Ztg.*, 15, 310.  
 1892, A. W. Dowet, *Am. J. Pharm.*, 64, 458.  
 1895, *Am. Bee*, J., 35, 825.  
 1896, *Am. Bee*, J., 36, 146, 245, 262 and 372.

305 *Cherry St., Philadelphia, Pa.*

DR. BARTLEY: I would like to know the date of this case of poisoning mentioned in this paper.

MR. KEBLER: Last November.

DR. RUSBY: On theoretical grounds it is extremely difficult to see how andromedotoxine from the Ericaceæ can get into the honey through the nectar contained in the flowers, and the same thing with gelsemine. I think it would be interesting to know whether the symptoms were the symptoms of those two poisons, and whether the experiments were accurately made, and whether the andromedotoxine was really present in the honey. It seems impossible.

MR. ALPERS: Are the bees themselves that collect this poisonous honey and feed upon it during the winter months affected by it, or have any observations been made in that direction?

MR. KEBLER: I do not know if anything has been done in that direction. Of course, the bee-keepers are in this position, that they do not want to have anything get out that will affect their pockets, and anything that is observed in that direction they keep quiet.

The following paper on the manufacture of potash was read by Dr. T. D. Reed, of Montreal, Can.

#### CANADIAN POTASH.

BY T. D. REED, M. D.

I had the honor of presenting at the Chicago meeting of the American Pharmaceutical Association, a short paper on Canadian Potash, and desire now to add a few points in continuance of the subject.

I referred to the great falling off of manufacture, and gave statistics. Since then the figures show a slight increase; the quantity passing under observation in 1895 being 415 casks of "Pearls" and 1904 casks of "Pots," containing one million and a half pounds.

In addition to this quantity, it is probable some is sold without inspection, but not much.

The testing being alkalimetric, it has been suggested that a sample, partly or even wholly soda, might pass, but we have in the flame test, fortunately, a ready safeguard against this sophistication. A wire dipped in genuine potash and held in the Bunsen flame gives but little evidence of sodium. A control experiment, made with a sample prepared with less than 10 per cent. of soda, gave the sodium-yellow overwhelmingly. We thus easily exclude added caustic soda. The manufacturers do not seem, as yet, to have caught on to this method of making potash. The falling price of potash also tends to diminish the temptation to spin out the product with soda.

Until recently the only thing to be on the lookout for was salt, the chloride being tested in every case, and taken as NaCl; the difference, due to a portion being potassium chloride, is negligible.

Not very long ago a curious discovery was made; in a lot of six casks, two turned out all right, but the others contained cakes which had stones

imbedded in them. The manufacturer had selected a silicate stone, not very different in color from the potash. I regret that it was impossible to preserve a specimen, as proof of this coarse and reckless operation.

*Montreal, Can., Aug. 1896.*

Mr. Alpers read a paper on Gelatin Capsules and exhibited a new capsule filler designed by himself.

## GELATINE CAPSULES.

BY WM. C. ALPERS.

### 1. *History of the Capsule.*

During the last fifty years, the filled and empty gelatine capsules have become of such general use among physicians and pharmacists, that a short history of their origin and development may not be without interest. Our Pharmacopœia ignores them entirely, and the various hand-books on pharmacy contain but very scant information on this useful article.

In compiling the following notes, the writer consulted the libraries, public and private, of New York, as far as they were accessible, and while he thinks that he has recorded all that is desirable to know on this subject, he cannot claim that nothing has been overlooked or forgotten, and will be glad to receive additions or corrections. He is greatly indebted for much valuable information to the firms of H. Planten & Co. and E. Fougera & Co., of New York, to Parke Davis & Co. and The Merz Capsule Co., of Detroit, Mich., and to the authors of the various pharmaceutical manuals.

The gelatine capsule was invented by Mr. A. Mothes, a French pharmacist, in 1833. Experiments had evidently been made before, but no evidence of success nor public acknowledgment can be found before this date. Official notice of the discovery was taken by two reports to the "Académie royale de Médecine," one on May 13, 1834, the other on February 28, 1837, both of which speak approvingly of it. On March 15, 1837, Dr. M. F. Ratier, a prominent physician and teacher of Paris, inserted in the "Dictionnaire de Médecine et de Chirurgie pratiques" (volume XV., page 285), an article on "Theribinthine de Copahu," in which he speaks of the happy idea of the gelatine capsules which admit of direct administration of either balsam of copaiva or its volatile oil without any addition liable to alter its virtues. There is therefore no doubt that this invention was at once welcomed by the medical and pharmaceutical professions as a safe method of administering nauseating liquids. The capsules were known after their inventor as "Capsules Gelatineuses de Mothes," and were manufactured and sold by the firm of Mothes et Dublanc of Paris. At first only capsules filled with balsam of copaiva were made, afterwards various nauseating liquids, principally oils, were treated in the same way. Soon a demand for empty capsules arose, and the firm supplied them also. The method of making these capsules was described by Mr. Cottureau in an

article in the "*Traité de Pharmacologie*" early in 1835. A small pouch made of a soft skin, shaped like a small olive, served as a mould. This pouch was fastened by means of a waxed thread to a small long-necked funnel of metal, the upper wide opening of which could be closed with a screw cover. Through this funnel the pouch was filled with mercury in order to expand it. A solution of gelatine and water was made in the proportion of one part of gelatine to three of water, and the expanded pouch dipped into it. On withdrawing, a rotary motion was given the instrument until the gelatine had almost hardened; if desired a second or third dipping might be used. The cover of the funnel was removed and the mercury poured out, by which the pouch would collapse and could easily be withdrawn. The neck of the capsule was then cut, leaving a small opening through which it was filled by means of a syringe. Finally a drop of the gelatine solution would close the capsule.

In 1838, Mr. Garot, a pharmacist of Paris, read a paper before the Pharmaceutical Society of Paris (*Journal de Pharmacie*, 1838, p. 78), in which he states that the manufacturers of capsules having refused to sell empty ones, he was forced to invent a plan of his own, in order to fill certain prescriptions of local physicians who did not wish to have the formula communicated to others. He proceeded by making a mass of the cubebs and copaiva and other substances, and divided and rolled the mass into pills. He then made a gelatine solution, using one part of gelatin to three of water, put the pills on needles, dipped them into the liquid, rotated them in the air until the gelatine was losing its liquid consistency and kept them on the needle by inserting the blunt end into a thick paste. After preparing about fifty pills, he would take each needle and warm it gently at a candle; the heat being sufficient to melt the gelatine around the needle to allow the latter to be withdrawn. A warm spatula and a trace of liquid gelatine would finally close the hole left by the needle. It will be seen that this is substantially the method used in later years by the manufacturers of gelatine-coated pills, although other methods are now employed by some. Mr. Garot, therefore, was the inventor of the gelatine-coated pill in 1838. Two years later (*Journal de Pharmacie*, 1840, p. 585), Mr. Vée proposed an improvement in the coating material by using one part of gelatine, seven parts of jujube, and water enough to dissolve both to a syrupy consistency. This mass would prevent the cracking of the coating caused by the rapid drying and contraction of the gelatine, and also leave a pleasant flavor in the mouth after swallowing the pill. Another modification was recommended in 1848 by Mr. M. G. Jozeau (*Gazette Médicale de Paris*, 1848, iii., 193), by substituting casein for gelatine.

Returning to the capsules, it must be noted that the process invented and employed by Mr. A. Mothes was a rather complicated one, and we cannot wonder that ingenious minds looked for improvements. Such an

improvement is recorded in the "Journal de Pharmacie et de Chimie" (vol. 1846, p. 354), by Mr. A. Giraud. He took small, iron, olive-shaped balls with a wire attached to one end, and after covering them with a thin coat of sweet almond oil, dipped them into a solution of syrupy consistence of 24 parts of gelatine, 4 parts of syrup of acacia, 6 parts of simple syrup, and 20 parts of water. The coated moulds were suspended by means of the wire, until the gelatine was cold enough to be touched by the fingers, when he would grasp each one with the hand and briskly withdraw the mould. The gelatine mass was elastic enough to expand and contract again. Mr. Giraud finally asked if there would be legal objections to using this method. The answer is given in a foot-note, stating that this process cannot be used, as it interferes with the patent of Mr. Mothes. It seems, however, that Mr. Mothes himself took advantage of this paper, for in 1850, that is, four years later, we find in the "Journal de Pharmacie et Chimie" (vol. 1850, p. 204), a communication signed H. B., to the effect that Mr. Mothes has introduced an improvement in making his capsules, in order to overcome the variations in size, by taking iron moulds of the shape of an olive suspended by wires. Then follows the same description that Mr. Giraud had given before, without giving him the credit of the invention. We must surmise that French manufacturers, just like their American brethren, are in the habit of re-inventing, whenever the original inventor is careless enough to publish his invention without patenting it at once. From this time the gelatine capsules were generally used by the French pharmacists and physicians, and we find many evidences in the various French pharmaceutical journals. Formulas for certain mixtures are recommended, ending generally with the phrase: "Then fill into gelatine capsules, and close them in the usual way." It might be mentioned that in 1878 (Journal de Pharmacie et de Chimie, 1878, ii., p. 74), Mr. Detenhof gives again a description of a method of making capsules, which differs from Giraud's method only in the material. Detenhof used 7.4 gelatine, 14.4 water, and added 14.4 glycerin; he was probably the first one to recommend glycerin in the gelatine mass.

The French Pharmacopœia also took notice of this invention, and we find an official formula for the manufacture of the gelatine capsule in the edition of 1866 of the "Codex Medicamentarius." The mass employed consisted of gelatine, 30 parts; gum arabic, 30 parts; sugar, 30 parts; white honey, 10 parts, and water, 100 parts. The process differs from that of Giraud, in so far that the olive-shaped iron moulds are not provided with a wire, but are soldered with their elongated necks to a small plate, so that after dipping them into the gelatine solution they would stand erect until sufficiently dry to withdraw them from the mould. The last edition of the German Pharmacopœia also recognizes the capsules, and gives a similar formula. Also in other countries the capsules soon became very popular, and experiments to improve the method of their manufacture were made by many pharmacists.



In the "*Repertorium für die Pharmacie*" (1840, xxiv., 2, p. 158), we find an article on the "The Formation of the Gelatine Capsule" by Adolph Steege, court apothecary at Bucharest. He provided his moulds with wooden handles fitting snugly into perforations of a wooden plate. Putting about 50 such moulds into position, he dips them into the gelatine solution and then rotates the whole apparatus in the air until the gelatine has become solid enough to be handled. Taking each handle from the plate, he cuts the gelatine neck at the proper place, and pulls the capsule off the mould. This process is substantially still in use to-day, according to Remington's Pharmacy, 3rd edition, p. 1231, where the apparatus used by Parke Davis & Co. is illustrated and described.

In 1845, the London firm of Evans & Lescher brought into the market a capsule called after its inventor, the "Savaresse Capsule," covered by a small animal membrane, made from the small intestines of the sheep. A description of this invention is given in the *Pharmaceutical Journal*, 1845-46, p. 361.

It must not be forgotten that the capsules so far mentioned were, without exception, olive-shaped, and had to be closed with a drop of gelatine solution. They were hand-made and naturally expensive. The French manufacturers exported them to all countries, but it seems that they preferred to sell filled capsules of various formulas, and while the pharmacists of other countries handled them, the capsules did not become of general use. To us the question, how they were introduced into American Pharmacy, is of particular interest.

The first mention of gelatine capsules appears in the "*American Journal of Pharmacy*" of 1835, New Series, Vol. I., p. 351, giving a short translation of Cottureau's article in the "*Traite de Pharmacologie*," without any commentary. Only two years later we find in the same journal (*Am. Jour. of Ph.*, 1837, New Series, vol. iii., p. 20), a lengthy article on "Capsules of Gelatine," by Alfred Guillaou, graduate of the Philadelphia College of Pharmacy, which is well worth copying :

Provide a suitable number of narrow tin dishes, about 18 or 20 in. in length,  $\frac{1}{2}$  in. deep, and about 2 in. in width. In the length of these and in a line, plant or solder at a distance of one inch from each other a number of smoothly formed metallic knobs of an ovoid shape, whose apex having been somewhat lengthened out, forms a thin neck by which they are attached to the tin dishes. This neck may be about  $\frac{1}{2}$  of an inch in length. Procure a sheet of tin and perforate with round holes, of which the diameter will be equal to the thickness of the knobs. Having greased the knobs well with lard, so as not only to prevent any adhesion to them, but also the adhesion of the inner sides of the capsules to each other after casting, pour melted glue (the most transparent having been selected) upon them and allow it to become tolerably stiff. If you think the shell is too thin, a second coat may be poured upon the first. The capsule having been coated, this cast is allowed to cool down to the ordinary consistency of India rubber, and having run a knife around the neck, you twist it briskly around and pull it upwards off the knob. It will immediately collapse and lose the form imparted to it on the mould, but if laid aside to dry, will by the time it has hardened have regained the desired rotundity. Place it upon

your perforated plate or "filler," and you can thus conveniently fill it with the article prescribed, and close the opening with a piece of gold-beater's skin.

It will be noticed that Mr. Guillou used glue instead of gelatine, and also recommended iron moulds soldered by their necks to small tin plates, and therefore devised the instrument which is now official in the French Pharmacopœia. As this article was written in 1837, that is nine years before Mr. Giraud recommended his iron mould with wires, there is no doubt that Guillou was the first inventor of the improved process for making capsules, preceding even Steege's invention by five years. [Alfred Guillou was a clerk at the store of his brother-in-law, John Milhau, in New York City, when he experimented with "gelatine capsules." Later he graduated as Doctor of Medicine at the College in Albany, and went to Cuba, where he died in 1840 at the age of 26.]

The real capsule industry in America dates from 1836, when Mr. H. Planten emigrated from Paris and established a capsule business at No. 3 Chambers Street, New York, at the place where the East River Savings Institution is now located. Filled capsules, according to French formulas, were manufactured after the process of Mothes and new ones added whenever a demand arose. The capsules were first sold as "Mothes' capsules" and the labels printed in French and English. Powders were also put in the capsules, if ordered. Capsules in two parts were also made, the lower part filled and then capped. But their manufacture was soon abandoned as unpractical, the two parts rarely fitting well. The firm of H. Planten, now H. Planten & Son, never patented any machinery and invariably decline to announce their methods. How long they adhered to Mothes' original process or when improvements were made is therefore impossible to say. The old firm of B. Keith & Co. also attempted to introduce empty gelatine capsules and manufactured them here about 1860, but soon abandoned the attempt. E. Fougere & Co. of New York also imported French capsules for many years, but during the last 20 years the domestic capsules on account of their cheapness superseded those imported.

In 1863 the firm of H. Planten took up the industry of empty capsules for powders and liquids. The first capsules intended for powders alone were called by them Jujube Paste capsules and were offered to the trade before 1870. Another manufacturer, Dundas Dick, also experimented in the same direction and secured a patent on cone-shaped capsules as early as 1865. The first inventor, however, to manufacture capsules, as now used, by machinery, to devise ingenious apparatus for their production on an extensive scale and to render their use popular in pharmacy, was Mr. F. A. Hubel of Detroit. He secured his first patent for a capsule machine February 13th, 1877, although he had already manufactured and sold empty capsules as early as January, 1875. (See Parke, Davis & Co. price-list of 1875.) From this date till 1883, we find a long list of patents in the records of the patent-office, some of them granted to Mr. Hubel,

some to other inventors. Disputes as to priority soon arose, and law suits followed, in which Mr. Hubel was victorious. His whole output is brought into the market by Parke, Davis & Co. The following is the process employed by him, which I copy verbatim from a letter that Parke, Davis & Co. had the kindness of sending me in answer to my inquiry :

"Metal moulds set in metal plates are first lubricated, and then dipped into solution of gelatine. They are withdrawn at a regulated speed, the solution being of a given temperature, and that temperature being higher according as the temperature of the moulds is lower and *vice versa*. The temperature of the moulds, and of the solution and the speed at which the moulds are withdrawn, determine the thickness of the capsule. The solution comprises seven parts of water to four of gelatine. After dipping, the gelatine investment is allowed to congeal sufficiently and it is then cut by a special cutting machine, and the waste about the cut is shoved away from the capsule. The capsules are dried by passing a current of air over them, and when dry and hard are stripped from the mould by machine. The caps are joined to the bodies by hand, and at the same time defective capsules are sorted out and rejected. The finest quality of gelatine is alone suitable. The one other process we are familiar with varies from the foregoing only in the fact that after dipping the moulds, the capsules are allowed to dry wholly, or almost wholly, before stripping."

I also quote from a letter of "The Merz Capsule Co." of Detroit, who write : "In order to make capsules properly and sufficiently cheap it requires a large amount of complicated and expensive machinery, and constant attention to small details, in as much as the one-thousandth of an inch difference, more or less, in the thickness of a capsule will either make it a loose-joining or a tight-joining capsule."

The last invention on the field of capsules is that of Mr. Heineman who now manufactures empty elastic capsules for fluids.

"By means of these the druggist is enabled himself to fill elastic capsules as occasion may require, perfectly and without loss of time, doing the work as well as the capsule manufacturer himself could do the same in the factory. The convenient shells will keep almost indefinitely, are always ready for use, and enable the druggist not alone to avoid carrying a large stock of filled capsules, but enable him to dispense freshly made capsules containing an almost indefinite variety of formulas with whatever variations physicians may be pleased to give them from time to time, as the needs of the patient may require."

The use of the gelatine capsule is daily extending, not only in medicinal and pharmaceutical adaptation, but also for mechanical purposes of varied kinds. They are employed for beef juices and other extracts, for candies and chocolates, for inks and blueing. The latest use to which they are put, is for packing cigars, in order to better preserve the flavor, and daily new ideas appear in which the gelatine capsule may take part in due time.

## 2. *Filling the Capsule with powders or pill mass.*

There exists a great diversity of opinions as to the proper way of dispensing medicinal media in gelatine capsules. While some pharmacists claim that a mass should always be prepared, others contend that the only proper way is to fill the mixture of the various items of the prescription in powder form into the capsule. Under certain circumstances both may be right. Physicians are not always explicit in writing prescriptions and often omit to state in what form they wish the medicine administered. If they would simply add "*fiat massa in capsulas dividenda*," or "*fiant pulveres in capsulas dividendi*," all doubts would be dispelled. But there are only a few who do this, and as long as the *modus operandi* is left to the judgment of the pharmacist, a definite rule should be adopted.

The public in general prefer capsules filled with *powder*, and all pharmacists know the sometimes very troublesome customer who will insist on having his 20 grains of quinine put into ten capsules, because "they act better that way." The argument that a dry powder is more readily dissolved or absorbed than a more or less compressed pill, is a very plausible one and hard to refute. In reviewing prescriptions on which capsules are ordered, we will find that the majority, almost 65 per cent. are orders for pills, that is to say, they contain ingredients whose mixture will result in a pill mass. Vegetable extracts of more or less soft consistency, oils of various natures, articles like oxgall or ichthyol, and similar drugs, all these can only be prepared in pill form; for to make powders of them would require an addition of so much absorbing powder, as to make the powders unreasonably large. To this class we must also count those prescriptions that contain deliquescent salts or such chemicals which by their mixture will turn moist or liquid. There can be no question about such prescriptions and our investigation is therefore restricted to prescriptions that are composed only of dry ingredients or in which the amount of liquid medicaments, like a few drops of some ethereal oil, is so small that it will be readily taken up by the solid ingredients without the addition of any absorbing powder. What is ordered in such cases, powders or pills?

Let us take analogous cases. Would a pharmacist think of changing a prescription for pills into one for powders, or one for powders into a liquid? Is it not the rule to dispense conscientiously whatever is ordered, and not alter a prescription in the least, unless the limits of safety have been transgressed? Why then should a mixture of drugs ordered in powder form be changed into a pill mass? A capsule is, according to all authorities, a cover for nauseating or strong smelling medicines, no teacher or encyclopedist restricts its meaning to pills alone. A pharmacist, therefore, has no right to suppose that a physician wishes to order a pill mass when he orders powders, especially as the prescriber has it in his power to add the words "*fiat massa*," and thereby express such desire if it existed. Where, however, such a remark is wanting, there is no reason why a mass

should be formed. *Powders*, not *pills* are ordered to be put into capsules, and the pharmacist who changes the powders into a mass doubtlessly transgresses the limits of his professional liberties. And what other motive to do so can there exist, but the desire to save time and labor? The tendency of late years to prepare prescriptions at lower prices than all the competitors and sacrifice everything to cheapness, has reduced not only the time allotted to each prescription, but also the care and solicitude so necessary in the fulfillment of our professional duties. It goes quicker to make a mass and cut it into so many parts than to carefully weigh each powder, and let the accuracy with which the last powder balances the calculated weight serve as a proof of the correctness of all powders.

It is claimed that in many instances the bulk of the dry powder would necessitate a very large capsule, while a mass could be compressed to a much smaller volume. In answer to this argument we must not forget that it is not the pharmacist's province to regulate the bulk of the medicine, or to correct a physician, as long as the dose is within the limits of safety. If a physician chooses to order a mixture containing as a dose one-sixtieth grain of strychnine dissolved in a tablespoonful of some aromatic liquid, no pharmacist would consider it his duty to change the tablespoon to a teaspoon, and thereby reduce the bulk of this medicine to one-fourth of the prescription under the plea that the bulk of the dose was too large. If, therefore, the physician orders a powder to be put into capsules and the largest capsules alone will hold the prescribed dose, there is no reason why the pharmacist should change the order. Nor is it always true that a mass will reduce the bulk. In the first place it is always necessary to add some excipient, if it be only water, thereby adding to the weight; very often adhesive vehicles as gum acacia, tragacanth, various mucilages or glycerites are needed to form the mass. The danger of adding a little too much of a liquid vehicle, and then being compelled to correct the mistake by adding some solid, often increases considerably the bulk of the mass without adding to its medicinal properties. Furthermore, while all these ingredients may be perfectly harmless, if considered by themselves, they may yet change the finely comminuted powder to a hard lump, which instead of being easily assimilated by the patient would pass undissolved through the system or even be the cause of serious digestive disorders. Lastly, we may also state that although there are people who prefer small capsules to large ones, there are just as many who will take a large capsule as readily as a small one.

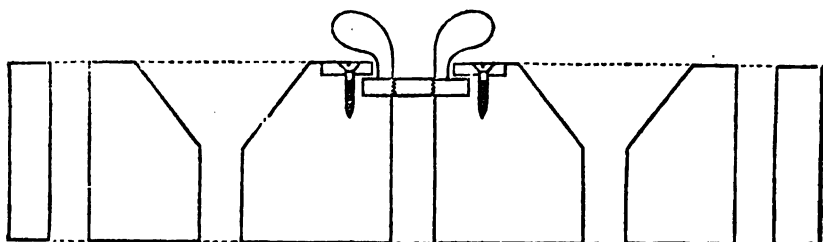
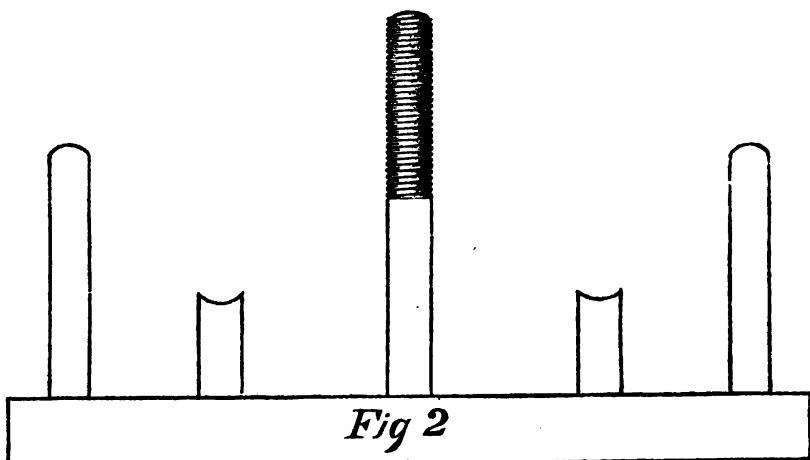
A few words may be added about the filling of capsules, which seems to be a difficult task to some pharmacists. Whenever a mass is first prepared, little difficulty is experienced. The general procedure is to roll the mass and cut it into the required number of pieces, in such a way that each piece has the shape of a small cylinder, of a diameter a little smaller than that of the body of the selected capsule. The operator should then

wash his hands, in order to remove all traces of the mass, and then introduce the small cylinders into the capsules by means of a needle with which he picks them up. As especially fit for this work, I mention the small botanical needles used in dissecting flowers, which are provided with a wooden handle, an instrument that every pharmacist can prepare himself. The covers are afterwards put on with the fingers. By this method, the odor as well as the taste of the ingredients of the mass are thoroughly covered by the capsule. Care should be taken not to select too large a capsule, so that the mass after drying will fill only half the space ; but even with the greatest care in preparing the mass a shrinking will afterwards take place, an inconvenience which it seems impossible to overcome.

During the last year, I have given this method of filling capsules my special attention and compared repeatedly the cylindrical parts of the mass by weighing them. In very rare instances have I found two parts that weighed exactly the same, the variation in my own work ranging from a fraction of 1 per cent. to 3 per cent., in spite of the greatest care exercised. Experiments with masses cut by other operators showed a similar, sometimes worse, result : I have discovered two apparently equal pieces of the same mass to vary as much as 8 per cent. In most instances this lack of exactness seems to be irrelevant, but we must admit that if we once allow a variation it is hard to draw a limit. I have therefore adopted a better and more correct method, and during the last six months, instructed my assistants to weigh the mass, divide the weight by the number of capsules ordered, and then weigh each part separately before putting it into the capsule. Objection might be raised that this is a troublesome and tedious procedure. But this is not so. By using the metric weight a division is quickly made, and the weighing of from 12 to 20 small parts requires no longer time than the rolling and cutting.

To introduce powders into the capsules is not quite so simple, and requires a small apparatus to insure correct results. Some pharmacists resort to the rather crude method to put the powder, without dividing it, on a piece of paper, take the body of the empty capsule between the fingers in the left hand and the cover in the right, and fill both by shoving them through the powder repeatedly. This method which is even recommended in one of the newer works of pharmacy as the best means of filling capsules is objectionable in more than one respect. In the first place it is impossible to gauge the quantity of the powder that is thus introduced into the capsule, and repeated weighing of each capsule becomes necessary, until the correct weight is reached, sometimes after many trials. Secondly, the very object of the capsule is entirely ignored ; particles of the mass will adhere to the outside, and neither taste nor odor of nauseating medicines can afterwards be entirely removed. A capsule filled with quinine in this manner, will taste bitter no matter how often it is wiped after filling, and if the mass should contain such strong smelling ingredients as asafetida

or valerian, their odor can never be removed. The proper way, insuring correctness and elegance, is to weigh each powder separately, and introduce it into the empty capsule by means of a small apparatus, of which various kinds are in the market. There is Raymond's capsule filler, consisting of a block of wood with a number of sockets for the empty capsule, and a second block with a corresponding number of funnel-shaped receptacles; another instrument, the Davenport capsule filler, consists of a metal funnel for the capsule and a plunger. Both these and other apparatus have their advantages and drawbacks.

*Fig 1**Fig 2**Fig 3*

TRANSVERSE SECTION OF CAPSULE FILLER.

I have here an instrument which I think is an improvement on the others. It consists of a base (Fig. 2), with a number of small plugs, and a block (Fig. 1), with a corresponding number of holes into which the plugs fit; these holes are widened at the upper side into small funnels. At the sides are pegs as guides for the upper block, so that each hole will be exactly

over each plug. In the center of the baseboard there is a small metal rod with a thread for a screw-nut at the upper end; the nut for this thread is held on the upper side of the perforated block by an overlapping flange, and can be turned easily by means of a pair of wings. A short plunger (Fig 3), concave at one end and convex at the other completes the apparatus.

The *modus operandi* explains itself. The two blocks are arranged so as to place the upper one over the lower one, the empty capsules are introduced and pushed by means of the plunger into the perforation until they touch the plugs; if necessary the upper block is lowered by means of the screw until the upper parts of the capsules are even with the funnel-shaped widening of the perforations; the powders, each one having been weighed, are put into the funnels and pressed down with the concave end of the plunger, leaving a small elevation over each capsule for the hollow of the cover. By a few turns of the nut the capsules are now partially raised out of their casings, high enough to put the covers on, these latter might be moistened inside with a trace of water by means of a camel's hair pencil, and thereby glued on. After the covers are put on, a few additional turns of the screw will raise the capsules entirely out of the casings.

As a resumé I would submit the following rules:

1. Always follow the physicians's directions as to the formation of a mass.
2. If no directions are given, form a pill mass whenever the ingredients cannot be mixed in powder form. Weigh the mass, divide the weight by the number of capsules ordered, weigh each part and give it the shape of a small cylinder by rolling it between the thumb and first finger. Wash the fingers and introduce the cylinders into the capsules by means of a needle.
3. If no directions are given, and the ingredients of the prescription will form a powder, divide their combined weight by the number of capsules ordered, weigh each powder separately and introduce it in powder-form into the capsule by means of a convenient apparatus. Under no condition should the undivided powder be forced into the capsules, by moving the bodies and covers through the powder from opposite directions.

MR. REMINGTON: Mr. Chairman, I have followed the reading of this paper with a great deal of interest, and I certainly must congratulate Mr. Alpers upon the exceedingly thorough manner in which he has worked up this paper on gelatine capsules. I know it has cost him a great deal of labor and trouble to ascertain the historical facts bearing upon capsules. I would say that up to the present time there has been no history or bibliography of the making of capsules, which has grown to be such an enormous industry; and the following up of this history of the improvements in the making of capsules is worthy of great praise. I think, even if we did not know Mr. Alpers, that we would feel certain that he was born in no other place than Germany, on account of the thoroughness which characterizes his work.



The following paper on the destructive distillation of linseed oil was read by the author :

SOME RESULTS OBTAINED IN THE DESTRUCTIVE DISTILLATION OF  
LINSEED OIL, WITH REMARKS ON ITS BEARING ON ENGLER'S  
THEORY OF THE ORIGIN OF PETROLEUM.

BY S. P. SADTLER.

It is well known that in boiling linseed oil for varnish-making and similar purposes, inflammable vapors are given off, the boiling being continued often until they burn freely. Very little has been noted with regard to the character of these vapors, and I know of no special study of them. During the past winter, in connection with the examination of some boiled oil driers for the Atlantic Drier Co., of Philadelphia, I was surprised to find some 40 per cent. of neutral petroleum-like oils in the product. The natural explanation of adulteration with mineral oils being out of the question in this case, I was led to ask as to the process used for the preparation of the boiled oil. I found that it was boiled under pressure, and that considerable quantities of a liquid distillate were being condensed in the dome of a large still and returned to the material in the still. I had the process carried out for me specially and so arranged that I could collect the product of this destructive distillation of linseed oil, for so it proved to be.

At first the odor of acrolein was very pronounced and powerful, showing that the glycerin of the glycerides composing the oil was being decomposed ; later the odor was more that of a cracked petroleum oil, showing that the linoleic and other acids of the oil were undergoing decomposition. I submit a sample of the linseed oil used. It was a clear "old process" oil of specific gravity 0.929, and showing a saponification equivalent of 183, which is normal for linseed oil. The raw distillate collected after this acrolein odor had nearly disappeared I also show. It had a specific gravity of 0.860 and a saponification equivalent of 1.09, showing that it had been nearly all converted into a neutral hydrocarbon oil.

This was then redistilled from a small iron retort and two fractions collected, leaving a residue in the retort which had the appearance of petroleum residuum or reduced oil, such as is used in the manufacture of vaseline and similar products.

The two fractions were then treated with sulphuric acid as is done in purifying petroleum distillates, and the results are shown in the samples submitted. They resemble quite strongly what is called paraffin oil, showing the characteristic fluorescence of the latter.

From a portion of one of these fractions on chilling in a freezing mixture, scale paraffin was also separated, a sample of which I submit.

The results, while they can only be considered as preliminary, are sufficient to show that we have hydrocarbon oils analagous to the natural

petroleum or mineral oils formed in the distillation of linseed oil under pressure. I have not yet extended this line of experiments to the other seed oils, such as cotton seed and rape seed oil, but believe it to be very probable that similar results could be obtained from them. I expect to do this, as well as study more fully the products already obtained. I may be allowed to call attention to what seems to me to be the importance of these results in their bearing on some well known work of Prof. Engler, of Carlsruhe, Germany. In 1888 and '89, Prof. Engler published in the *Berichte of the German Chemical Society* (Ber. xxi., p. 1816, and xxii, p. 592) the results of these experiments on the distillation of menhaden oil under pressure. He began at a pressure of ten atmospheres and ended at four atmospheres. A distillate came over at 325° to 400° C., and was approximately 60 per cent. of the oil taken.

The new distillate was of brownish color, transparent in thin layers and of a strong green fluorescence. Its odor was not unpleasant and contained no recognizable amount of acrolein.

The specific gravity of this distillate was 0.8105.

On the basis of these results Engler propounded a theory, which has been extensively discussed and generally accepted, that animal remains seem to be indicated as the main source of the formation of our petroleum deposits. His view, as expressed in the paper referred to, is that while the nitrogenous tissue of these animal deposits has disappeared, as the most readily alterable portion, the fatty tissues have undergone a slow destructive distillation under pressure with the formation of our petroleum oils.

In the light of results presented in this note on the destructive distillation of linseed oil, it is difficult to see how we can avoid widening Engler's theory so as to include the vegetable oil seeds as probable additional sources of the petroleum oil formation. Moreover, I see no reason, if lard oil will yield the results which Engler has obtained, to doubt that vegetable oleins like olive oil and its class may also be found to be capable of the same changes.

Prof. Engler showed at the World's Fair Congress of Chemists in 1893 a refined burning oil and scale paraffin which had been obtained by him from fish oil. I have here the corresponding products, including scale paraffin from linseed oil.

MR. FENNEL: I would like to ask how far the requirements of the Pharmacopoeia apply to the differentiation of adulterated oils. I ask that for the reason that the State of Ohio recently passed a law requiring the purity of linseed oil to meet the requirements of the Pharmacopoeia for commercial purposes. I have done some little work on the subject, and I see the difficulty that will be met within the differentiation.

THE CHAIRMAN: I believe it will be necessary to make some changes in the statements that refer to the purity of linseed oil products. If this process is carried out in the manufacture of linseed oil, it may give rise to trouble, because we have here what at first sight looks like adulteration. I thought it was adulteration at first, but the party pro-

ducing the oil assured me that it was not adulterated, and said: "Come down to the factory, and I will throw the whole thing open to you." It is simply because they condense thoroughly what otherwise is lost that they have been able to do away with the necessity of adulteration, and by taking the products of distillation get a sufficient diluent. If you take the saponification equivalent of the mixture, and measure the oil that will be shown by shaking up with sulphuric acid, you will be able to recognize it. I cannot at the present moment say how you are going to differentiate between the adulterated oil and the one prepared by this process.

MR. CASPARI: I believe Prof. Fennel's question applies more particularly to the official or raw oil, while the statements contained in the very interesting paper, just read, apply to boiled oil used in paint for drying purposes, which oil is not used in the Pharmacopoeia. This discovery that has been made with reference to boiled linseed oil, is probably of less import in the Pharmacopoeia than it will be for technical purposes.

THE CHAIRMAN: I had the same thought concerning it. I do not think that anything more than pure normal oil is required by pharmacists, and, of course, the adulteration of that with mineral oil would readily be detected, it changing the saponification equivalent; and there is no reason for any such products being present, because the linseed oil as used by pharmacists need not be boiled, and it is not supposed to be.

MR. LLOYD: Do I understand that about 40 per cent. of neutral petroleum-like oil was found?

THE CHAIRMAN: In the commercial sample first examined I found 40 per cent. of petroleum product.

DR. PAYNE: I would like to ask what percentage of hydrocarbon oils was obtained on distillation.

THE CHAIRMAN: I think it was between 50 and 60 per cent.

The following paper was read by Mr. Hallberg:

#### ON SOLID PREPARATIONS FOR INTERNAL USE.

BY C. S. N. HALLBERG.

The past decade has wrought great changes in the administration of medicine. Responding to the more æsthetic demand of the age, medical practitioners have quite largely dispensed with the older forms of liquid mixtures, and adopted the solid and more elegant products of the pharmaceutical art. While dry medication has been increasing in favor for the past twenty years, history discloses some of the errors its votaries have been led into. First was the sugar-coated pill period, which set in about 1870 and reigned supreme until about 1880, when it was superseded by the gelatin-coated pill, despite the attempt to stampede its followers in 1875 by the compressed pill. For ten years the gelatin-coated pill was the favorite form, until the general use of gelatin capsules relegated it to the insoluble and unsatisfactory sugar-pills of the patent medicine men.

The introduction of the tablet triturate ten years ago met with much favor for the administration of alkaloid salts, and represented a convenient form for the ready preparation of solutions for hypodermic and antiseptic

use. But as disclosed by the history of other forms of medication, the original purpose of the tablet triturates was perverted, and in the modified form of compressed tablets, the "idea" was extended to comprise nearly every combination of remedies, irrespective of therapeutic uses, and in utter defiance of well-known chemical and pharmaceutical laws and principles.

For purposes of studying the administration of solid substances, they may be grouped, from a therapeutic point of view, as follows:

*Powders.* The medicinal agent in a finely divided condition, either alone, associated with some other agents, or triturated with some inert substance. The object to be attained is either quick solution, absorption or local effect, which is produced in the degree that the mixture is finely powdered. Following the law of solution, the greater extent of surface presented to the solvent action, the more the process of solution is facilitated. With most substances the effect is a question of absorption, which is again dependent upon solubility. The only exception, to this are sugars and gums, which dissolve so readily, and the solution formed is so viscous, as to interfere with their complete solution except under certain conditions.

Troches, lozenges, tablets, pastils and similar forms by whatever name—mixtures of medicinal substances intended for solution in the mouth. The medicinal agent is incorporated either with a dry diluent, such as sugar, and the mixture made into forms by compression, or into a mass with an excipient and then divided into various forms, as in pills. The medicinal agent is mixed with the diluent or excipient, which, being sugar or gum, slowly dissolves by the heat and moisture of the mouth and serves as a vehicle for the gradual distribution and solution of the medicinal agent. A prolonged local effect is thus produced upon the surfaces of the throat and respiratory organs.

*Pills.*—Medicinal agents designed for slow solution and retarded absorption in the stomach and intestines. These are made into a mass with adhesive substances, gum, sugar, etc. (excipient), which, responding to the exception noted in relation to solution, permit the gradual solution of the mass, and consequently retard the effect of the medicinal agent. The complete solubility of a pill is of course essential in order to assure the desired action, and for this reason such excipient must be selected as will not react with the medicinal agent, so as to cause the mass eventually to become hard and insoluble. The essential property of a mass and therefore of a pill is a physical condition which will insure softening, then gradual disintegration, and finally complete solution in digestive or intestinal fluids. A pill may be so hard as to be brittle (comp. cathartic pill), and yet be perfectly soluble, and again when so hard the pill may be almost insoluble in the liquids of the body. The salts are generally not adapted to the pill form unless mixed with extractive or saccharine matter, as in the case of the compound cathartic pill, and compounds of mercury,

antimony, etc. The salts of the alkaloids are largely administered in this pill form, and may become quite insoluble in course of time. Even the substances mostly used as excipients, sugar and gum, while inert therapeutically, it must be remembered are not chemically inactive, and may produce compounds more or less insoluble upon change and exposure. This is true in a greater degree when two or more chemical agents are combined in a pill. For example ; bismuth subnitrate and calomel made into a mass with mucilage or glycerite of starch affords a pill which, upon standing, becomes as hard as cement and entirely insoluble. Reactions take place between chemical substances like these, no matter how carefully selected the excipient, which either impairs their solubility or renders them otherwise unfit for therapeutic uses.

The medicaments adapted to the pill-form administration may be said to comprise the following :

- Tonics, hæmatinics, stomachics, hepatics.
- Purgatives, laxatives, cathartics, anthelmintics.
- Ecbolics, emmenagogues, antispasmodics.
- Antigonorrhœal, aphrodisiacs, antaphrodisiacs.

The medicinal agents adapted to the troche or tablet form of medication are confined to the following :

- Astringents, antacids, aromatics.
- Expectorants, pulmonary sedatives.
- Demulcents, emollients, vermifuges.

*Powders.*—These comprise by far the greatest number of remedies, but the following are chiefly represented by this form of medication :

- Emetics, diaphoretics, sialagogues.
- Sedatives, narcotics, hypnotics.
- Tonics, antiperiodics, antipyretics.

The objection to powders is the disagreeable taste of many remedies. Since this has been overcome by the use of cachets or konseals it leaves in this modified form powders as the most elegant form in which a very large class of remedies may be dispensed. It enables the physician to formulate his own prescriptions instead of prescribing ready-made combinations, and also affords the pharmacist the opportunity to practice his art for the preparation of medicines.

Mr. Caspari read a paper on the errors likely to result from the use of alcohol in alkaloidal titrations.

#### ALCOHOL AS A SOURCE OF ERROR IN THE TITRATION OF ALKALOIDS AND ALKALOIDAL RESIDUES.

BY CHAS. CASPARI, JR.

Methods for the volumetric determination of alkaloids in crude drugs and galenical preparations frequently include directions to dissolve the varnish-like residue (after the same has been washed with ether and dried

to constant weight) in alcohol, with the aid of heat if necessary, and then to add water until a slight permanent turbidity results. A definite quantity of decinormal acid, sufficient to insure a slight excess, having been added to the mixture, the excess is titrated with centinormal alkali in the presence of a suitable indicator.

In the course of some recent analytical work, the writer observed that alcohol appeared to influence the color produced by acids and alkalies with different indicators in the titration of alkaloidal residues, and a series of experiments was, therefore, made to study more closely the nature of the changes observed, and also to determine, if possible, whether alcohol really was the disturbing factor.

Plain water, diluted alcohol (a mixture of equal volumes of alcohol and water), 94.5 per cent. alcohol (commercially known as cologne spirit) and absolute alcohol, were employed in connection with decinormal sulphuric acid and centinormal potassium hydroxide solution, as also the following well-known indicators; hæmatoxylin, cochineal, Brazil wood, methyl orange or tropæolin OO, lacmoid and litmus. Tap water was found unfit for colorimetric work, as it invariably caused an alkaline reaction with the indicators, even after having been well boiled, and pure distilled water was, therefore, employed instead. 10 Cc. of the respective liquids were put into a beaker, together with the indicator, and acid or alkali added until the desired change of color was produced.

The following results are very significant and well worthy of attention :

*Hæmatoxylin solution*, 1 Gm. to 100 Cc. alcohol. 3 drops were used for each experiment.

10 Cc. distilled water; the addition of 1 drop  $\frac{N}{100}$  KOH sol. caused a decided purple color.

10 Cc. diluted alcohol required 0.65 Cc.  $\frac{N}{100}$  KOH sol. to produce the same purple color, which was again destroyed upon addition of a few drops of alcohol.

10 Cc. alcohol required 1.25 Cc.  $\frac{N}{100}$  KOH sol. to show a decided alkaline reaction.

10 Cc. absolute alcohol; a purple color was produced within one minute by the indicator alone without the addition of any alkali. The color, however, disappeared upon addition of a trace of decinormal acid.

*Cochineal solution*, 10 Gm. to 100 Cc. 25 per cent. alcohol. 5 drops were used for each experiment.

10 Cc. distilled water required 6 drops (about 0.2 Cc.)  $\frac{N}{100}$  KOH sol. for a decided alkaline reaction, indicated by a purplish red (onion-red) color.

10 Cc. diluted alcohol required 0.80 Cc.  $\frac{N}{100}$  KOH sol. to produce the same color, which was again destroyed by a few drops of alcohol.

10 Cc. alcohol required 1.4 Cc.  $\frac{N}{100}$  KOH sol. to produce the same color.

10 Cc. absolute alcohol required 0.1 Cc.  $\frac{N}{100}$  KOH sol. to show the alkaline reaction.

*Brazil-wood solution* (U. S. P. test-solution), 10 Gm. to 20 Cc. water with subsequent addition of 2 Cc. alcohol. 10 drops were used for each experiment.

10 Cc. distilled water required 5 drops  $\frac{N}{100}$  KOH sol. to produce the pink color indicating alkalinity.

10 Cc. diluted alcohol required 1.0 Cc.  $\frac{N}{100}$  KOH sol. to produce the same color, which was again destroyed by a few drops of alcohol.

10 Cc. alcohol required 1.6 Cc.  $\frac{N}{100}$  KOH sol. to show the alkaline reaction.

10 Cc. absolute alcohol required 0.25 Cc.  $\frac{N}{100}$  KOH sol. to produce the desired pink color.

*Lacmoid solution*, 1 Gm. to 500 Cc. 50 per cent alcohol. 10 drops were used for each experiment.

10 Cc. distilled water required 2 drops  $\frac{N}{100}$  KOH sol. to produce a decided purplish blue color.

10 Cc. diluted alcohol required 0.45 Cc.  $\frac{N}{100}$  KOH sol. to produce the same color, which was again destroyed by a few drops of alcohol.

10 Cc. alcohol required 0.7 Cc.  $\frac{N}{100}$  KOH sol. In this case the purplish blue color produced was discharged by a large excess of alkali.

10 Cc. absolute alcohol. A decided blue color was produced by the indicator alone, which was not changed by addition of an excess of alkali.

*Litmus solution* (aqueous solution). 4 drops were used for each experiment.

a. 10 Cc. distilled water; a purplish red color was produced by the indicator alone.

b. 10 Cc. distilled water required 2 drops  $\frac{N}{100}$  KOH sol. to produce a decided purplish blue color.

10 Cc. diluted alcohol required 0.2 Cc.  $\frac{N}{100}$  KOH sol. to produce the same color as in a.

10 Cc. diluted alcohol required 0.65 Cc.  $\frac{N}{100}$  KOH sol. to produce the same color as in b. The color was again destroyed by addition of a few drops of alcohol.

10 Cc. alcohol required 1.10 Cc.  $\frac{N}{100}$  KOH sol. to produce the same color as in b.

10 Cc. absolute alcohol produced the same color as obtained in b with the indicator alone.

*Tropæolin OO or Methyl orange solution*, 1 Gm. to 500 Cc. 50 per cent alcohol. 2 drops were used for each experiment.

a. 10 Cc. distilled water upon addition of 1 drop  $\frac{N}{100}$   $H_2SO_4$  gave the characteristic pink color, showing an acid reaction.

- b.* 10 Cc. distilled water with 0.1 Cc.  $\frac{N}{10}$   $H_2SO_4$  gave a decided crimson color showing a strong acid reaction.
- c.* 10 Cc. diluted alcohol required 1.10 Cc.  $\frac{N}{10}$   $H_2SO_4$  to produce the same color as in *b*.
- 10 Cc. alcohol with 3.5 Cc.  $\frac{N}{10}$   $H_2SO_4$  failed to produce the same color as in *b*; a deep orange red color was produced which gradually on further addition of 1.25 Cc.  $\frac{N}{10}$   $H_2SO_4$  changed to crimson.
- 10 Cc. absolute alcohol failed to produce a crimson color with 4.75 Cc.  $\frac{N}{10}$   $H_2SO_4$ .
- d.* 10 Cc. distilled water, treated as under *b*, required 0.97 Cc.  $\frac{N}{100}$  KOH sol. to produce a strong yellow color indicating alkalinity.
- 10 Cc. diluted alcohol, treated as under *c*, required only 10.20 Cc.  $\frac{N}{100}$  KOH sol. to produce the same color as in *d*.

From the foregoing reactions it is very evident that alcohol and absolute alcohol, as available in the market, exercise a decided influence on color indicators and may be the fruitful source of error in volumetric work. Strange to say, while alcohol appears to play the part of an acid toward hæmatoxylin, cochineal, Brazil wood, lacmoid and litmus, by requiring an increased quantity of alkali to produce the characteristic alkaline color reaction, it behaves quite differently towards methyl orange or tropæolin OO. In the latter case alcohol seems to lend to the indicator a strong alkaline reaction, requiring a phenomenal amount of decinormal acid to produce the characteristic acid color. The fact that absolute alcohol appears alkaline towards all of the above indicators is remarkable, and while no further examination of the article was undertaken, it is but fair to say that it was the product of a well-known reliable American manufacturer. The alcohol used was such as is usually sold to pharmacists by the jobber as prime cologne spirit.

If, then, alcohol plays so important a part in color reactions, it is more than likely that its presence will influence more or less the results obtained in the titration of alkaloidal residues, and hence it should be rigidly excluded in all such work if accuracy is desired. It may be employed to bring the impure (often resinous) residue into solution so that the decinormal acid can dissolve the alkaloid more readily, but should invariably be dissipated by the application of heat before titration of the acid solution is undertaken.

To show the effect of alcohol on the valuation of alkaloids, and to point out more forcibly the necessity for the absence of this solvent in such operations, four alkaloids, morphine, cocaine, atropine and strychnine, all of American manufacture, were assayed volumetrically both in aqueous and dilute alcohol solution. Quinine and cinchonine can not be determined volumetrically like the other alkaloids above mentioned, because when in acid solution, prepared exactly like the others, both give an alkaline color indication with cochineal and tropæolin; with hæmatoxylin and Brazil



wood, although the reaction at first is acid, an alkaline reaction occurs before the excess of acid is neutralized, and hence results entirely too high are obtained.

The solutions used in making the following determinations were so prepared that 100 Cc. of finished product contained 0.500 Gm. of alkaloid and 20 Cc. of decinormal acid. 10 Cc. of this solution were used for each titration, centinormal alkali solution being used to determine the excess of acid. The equivalent of 1 Cc.  $\frac{N}{100}$  KOH sol. in  $\frac{N}{10}$   $H_2SO_4$  was determined for each indicator so that accurate calculation as to percentage could be made. The proportion of pure alkaloid determined in both the water and the dilute alcohol solutions is given opposite each indicator for the sake of ready comparison, the quantity of indicator used having been the same as stated in the experiments with plain solvents, mentioned above. Two extra determinations were made in the case of each alkaloid, with hæmatoxylin and tropæolin OO, after addition of 5 Cc. alcohol to the dilute alcohol solution; this was done for the purpose of showing the effect of a larger proportion of alcohol, whereby the detrimental influence of the latter liquid is emphasized.

## MORPHINE.

Indicator.	Water Solution.	Diluted Alcohol Solution.
Hæmatoxylin.....	98.58 per cent.	96.05 per cent.
Cochineal.....	98.48 "	95.26 "
Brazil wood.....	98.32 "	89.68 "
Tropæolin OO.....	98.55 "	105.44 "
Lacmoid.....	98.91 "	97.56 "
Litmus.....	98.41 "	94.05 "

In the case of tropæolin the diluted alcohol solution required the addition of 1.53 Cc.  $\frac{N}{10}$   $H_2SO_4$  before a decidedly acid color was obtained and satisfactory titration made possible.

After addition of 5 Cc. of alcohol to 10 Cc. of the diluted alcohol solution the following results were obtained:

With hæmatoxylin.....	89.00 per cent.
With tropæolin OO, requiring the addition of 3.4 Cc. $\frac{N}{10}$ $H_2SO_4$ .....	107.68 "

## COCAINE.

Indicator.	Water Solution.	Diluted Alcohol Solution.
Hæmatoxylin.....	97.26 per cent.	94.65 per cent.
Cochineal.....	96.35 "	95.02 "
Brazil wood.....	95.95 "	90.71 "
Tropæolin OO.....	97.26 "	104.23 "
Lacmoid.....	97.44 "	96.53 "
Litmus.....	96.35 "	92.83 "

In the case of tropæolin the diluted alcohol solution required the addition of 1.56 Cc.  $\frac{N}{10}$   $H_2SO_4$  before a decidedly acid color was obtained and satisfactory titration made possible.

After addition of 5 Cc. of alcohol to 10 Cc. of the diluted alcohol solution, the following results were obtained :

With hæmatoxylin .....	92.84 per cent.
With tropæolin OO, requiring the addition of 3.2 Cc. $\frac{N}{10}$ $H_2SO_4$ .....	106.65 "

## ATROPINE.

Indicator.	Water Solution.	Diluted Alcohol Solution.
Hæmatoxylin.....	99.89 per cent.	96.82 per cent.
Cochineal.....	100.08 "	97.33 "
Brazil wood.....	99.75 "	94.62 "
Tropæolin OO.....	100.02 "	106.58 "
Lacmoid .....	100.38 "	97.95 "
Litmus .....	98.20 "	91.49 "

In the case of tropæolin the diluted alcohol solution required the addition of 1.52 Cc.  $\frac{N}{10}$   $H_2SO_4$  before a decidedly acid color was obtained and satisfactory titration made possible.

After addition of 5 Cc. of alcohol to 10 Cc. of the diluted alcohol solution, the following results were obtained :

With hæmatoxylin .....	92.95 per cent.
With tropæolin OO, requiring the addition of 3.2 Cc. $\frac{N}{10}$ $H_2SO_4$ .....	108.09 "

## STRYCHNINE.

Indicator.	Water Solution.	Diluted Alcohol Solution.
Hæmatoxylin.....	97.03 per cent.	94.59 per cent.
Cochineal.....	97.43 "	94.25 "
Brazil wood.....	96.53 "	89.11 "
Tropæolin OO.....	97.19 "	103.54 "
Lacmoid.....	98.03 "	97.19 "
Litmus .....	92.11 "	84.03 "

In the case of tropæolin the diluted alcohol solution required the addition of 1.5 Cc.  $\frac{N}{10}$   $H_2SO_4$  before a decidedly acid color was obtained and satisfactory titration made possible.

After addition of 5 Cc. of alcohol to 10 Cc. of the diluted alcohol solution, the following results were obtained :

With hæmatoxylin .....	87.64 per cent.
With tropæolin OO, requiring the addition of 3.3 Cc. $\frac{N}{10}$ $H_2SO_4$ .....	110.22 "

## QUININE.

Although quinine, for reasons already stated above, cannot be titrated in the same manner as the other alkaloids mentioned, the effect of alcohol can nevertheless be observed. Decinormal hydrochloric acid was used in place of sulphuric acid to avoid fluorescence, and hæmatoxylin was employed as the indicator.

When titrated in water the result showed 117.18 per cent. ; when titrated in a mixture of alcohol and water (equal volumes) the result showed 112.79 per cent.

It is possible that alkaloids and alkaloidal residues may be titrated with a fair degree of accuracy in alcoholic or hydro-alcoholic solution, provided the relation of the centinormal alkali to the decinormal acid has been previously determined for the particular indicator to be employed, in the presence of the alcohol or the mixture of alcohol and water ; but this necessitates extra labor as well as a knowledge of the proportion of alcohol present, since an increase or decrease of the latter materially affects the equivalent.

The following tables show at a glance the variation in the relation of alkali to acid, as indicated by color reactions, in the presence of different mixtures of alcohol and water. The presence of alcohol moreover seems to have a direct influence on the color produced by the indicator, and the changes are by no means as sharp as in water alone, and in some cases are even observed with difficulty, thus rendering the titration results less reliable. The decinormal sulphuric acid used was standardized by precipitation as barium sulphate and found to contain 0.004889 Gm.  $H_2SO_4$  in 1 Cc. With this acid the centinormal alkali solution was standardized, phenolphthalein being used as an indicator.

A. TABLE SHOWING THE NUMBER OF Cc.  $\frac{N}{100}$  KOH SOLUTION NECESSARY TO PRODUCE A NEUTRAL OR FAINTLY ALKALINE REACTION WITH DIFFERENT INDICATORS WHEN 10 Cc.  $\frac{N}{10}$   $H_2SO_4$  ARE TITRATED IN THE PRESENCE OF 60 Cc. OF DISTILLED WATER, ALCOHOL, AND MIXTURES OF ALCOHOL AND WATER.

Indicator.	Distilled Water.	Alcohol 1 vol. Dist. Water 2 vols	Alcohol 1 vol. Dist. Water 1 vol	Alcohol 2 vols. Dist. Water 1 vol	Alcohol 94.5 per cent.
Phenolphthalein .....	100.16	104.39	106.72	106.76	109.24
Hæmatoxylin .....	98.17	100.54	100.83	101.53	103.15
Tropæolin OO.....	98.42	96.93	96.11	94.70	74.65*
Cochineal .....	98.52	101.20	101.79	102.96	104.07
Brazil wood.....	98.57	102.09	103.10	104.28	106.28
Lacmoid.....	99.06	100.44	101.13	101.50	102.71
Litmus .....	98.66	102.69	103.40	104.93	106.32

\* Color very difficult to distinguish.

B. TABLE SHOWING THE EQUIVALENT OF 1 CC.  $\frac{N}{100}$  KOH IN DECINORMAL SULPHURIC ACID WHEN TITRATED WITH DIFFERENT INDICATORS IN THE PRESENCE OF DISTILLED WATER, ALCOHOL, AND MIXTURES OF ALCOHOL AND WATER.

Indicator.	Distilled Water.	Alcohol 1 vol. Dist. Water 2 vols	Alcohol 1 vol. Dist. Water 1 vol	Alcohol 2 vols. Dist. Water 1 vol	Alcohol 94.5 per cent.
Phenolphthalein .....	0.09984 Cc.	0.09579 Cc.	0.09414 Cc.	0.09367 Cc.	0.09154 Cc.
Hæmatoxylin .....	0.10186	0.09946	0.09917	0.09849	0.09694
Tropæolin OO.....	0.10160	0.10316	0.10405	0.10559	0.13396
Cochineal .....	0.10150	0.09881	0.09824	0.09712	0.09609
Brazil wood .....	0.10144	0.09795	0.09699	0.09589	0.09409
Lacmoid .....	0.10094	0.09956	0.09887	0.09842	0.09736
Litmus .....	0.10135	0.09738	0.09671	0.09530	0.09405

The only explanation that can be offered for this peculiar behavior of alcohol is on the basis of Arrhenius' theory of electrolytic dissociation, as detailed in the writings of Prof. Ostwald. According to the latter authority, indicators also depend for their value entirely upon dissociation, and although the various alcohols have a dissociating effect upon salts held in solution by them, it is less marked than in the case of water, and decreases with the increasing molecular weight of the alcohol.

The conclusions forced upon us as a result of the observations above enumerated are, that far more accurate volumetric determinations of alkaloids and alkaloidal residues can be made in water alone than in mixtures of the same with alcohol, and that the error caused by the latter is augmented as the proportion of alcohol is increased.

*Baltimore, Md., July, 1896.*

DR. BARTLEY: I do not find in the paper any statement of any attempts to get rid of this acidity of the alcohol. Do I understand that the work was carried on with the commercial article? Now, we know that alcohol undergoes oxidation to a certain extent in distilling. You nearly always get a slight odor of aldehyde. Is it not probable that by treating the alcohol beforehand with calcium carbonate this difficulty would be overcome? And in this connection I would like to ask was there only one quality of commercial alcohol used, or several?

MR. CASPARI: There were two samples of commercial alcohol, known as "cologne spirit," from different sources employed, and the results were frequently identical. The alcohol was not freed from any acid that might be present, by such treatment as Dr. Bartley suggests, but it showed itself no acid reaction. We had some very sensitive litmus paper with which it was tried. The absolute alcohol, which as stated was 99.8, was alkaline throughout.

MR. PRESCOTT: I should like to inquire how long the mixture of alcohol and dilute acid stood before the experiments were made. We know that alcohol and sulphuric acid are prone to form ethyl sulphates, and it might be possible that acid salts were produced, thus accounting for the behavior observed.

MR. CASPARI: No particular attention was paid to the time, as the mixture of alcohol and acid solution of alkaloids was made a few minutes before each titration. Under these circumstances a reaction between the alcohol and acid could surely not have occurred, particularly as the acid was present in very dilute form.

The object of the paper is mainly to call attention to the dangers of errors which the analyst is apt to be confronted with in following the directions often given for making alcoholic or hydro-alcoholic solutions of alkaloidal residues for volumetric determination.

MR. LLOYD: In connection with this paper I would say that I was forced to return two barrels of alcohol in view of the large amount of acetic ether found in it.

MR. KEBLER: I have been interested in this matter, and have observed a similar difficulty in titration about a year ago. I find that the quality of alcohol deserves to be considered very seriously. Just the day before I left home I examined two samples of alcohol that claimed to be and were 95 per cent. alcohol, but the other impurities were of such a nature that it was impossible to use it for manufacturing purposes. On the addition of silver nitrate it turned almost black, and on evaporating a small quantity of the alcohol a dark brown residue was obtained, showing that the alcohol was of a very inferior quality.

Mr. Lloyd read the following historical sketch of *Cascara Sagrada*:

#### HISTORY AND NAMES OF RHAMNUS 'PURSHIANA. (CASCARA SAGRADA.)

BY. J. U. LLOYD.

CONTRIBUTION OF THE RESEARCH COMMITTEE OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.\*

In a paper contributed to "New Preparations,"† October 15, 1877, p. 8, the late Dr. J. H. Bundy, an eclectic physician of Colusa, California, commended "*Cascara Sagrada*" as a valuable remedy in the treatment of constipation. This notice was by means of a brief note that was part of a paper on *Berberis aquifolium*, Dr. Bundy promising, however, to give it further attention, as follows:

"It is not my purpose to treat on *Cascara Sagrada* in this paper, but using it in connection with the *Berberis*, I simply make mention of it. In the future I will introduce the drug to the profession."

This, so far as the writer can determine was the first reference concerning this remedy in pharmaceutical or medical print. Agreeably to promise, in January, 1878,‡ Dr. Bundy contributed a paper on the subject, "*Cascara Sagrada*," in which he gave the uses of fluid extract of "*Cascara Sagrada*." Following this came many papers from Dr. Bundy and other physicians, twenty contributions on the subject being printed in "New Preparations," 1878, to which journal with few exceptions the subject was

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\* Introductory to a contribution from chemical investigations of *Rhamnus Purshiana*, undertaken by Alfred R. L. Dohme.

† New Preparations, Detroit, Parke, Davis & Co.

‡ New Preparations, January, 1878, p. 1.

confined during 1877 and 1878. Dr. Bundy stated in his paper (1878) that "A description of the Cascara I am unable to give at this time, but suffice it to say that it is a shrub, and in due time its botanical name will be known." He neglected, however, to concern himself further in the matter.

In the fall of 1878, Dr. C. H. Adair, of Colusa, California, a partner of Dr. Bundy, sent the writer specimens of the bark and botanical specimens of the tree yielding it. These, on identification by Mr. Curtis G. Lloyd, proved to be *Rhamnus Purshiana*. This fact was announced in a paper on "Some Specimens of Western Plants," presented to the American Pharmaceutical Association held at the meeting in Atlanta, Ga., November, 1878 (Proceedings, 1879, p. 707) and completed the drug's history.

*Names.*—Dr. Bundy supplied the drug under the Spanish name "*Cascara Sagrada*," which name is said to have been in local use throughout some sections of California, and soon came to be the common name of the drug. It will surely dominate all others as long as the drug is in use. The anglicised name "*Sacred Bark*" has also been applied to the drug, and the Scriptural term Chittem bark was also employed in early days in some parts of California, but these last names are now obsolete.

*Summary.*—To Dr. J. H. Bundy, Colusa, California, 1877, is due the credit of introducing the bark of *Rhamnus Purshiana* (*Cascara Sagrada*) to the medical profession.

To "New Preparations," Parke, Davis & Co., of Detroit, Michigan, (1877 and 1878) is due the credit of bringing the drug to the attention of physicians and pharmacists.

To Parke, Davis & Co., of Detroit, Michigan, (1878), is due the credit of making the first pharmaceutical preparation (the fluid extract) and of bringing this preparation into general conspicuity, through their advertisements and business connections. It may be said without danger of controversy that this firm introduced and established *Cascara Sagrada* as a remedy.

To Dr. C. H. Adair (1878) of Colusa, California, is due the credit of furnishing the botanical specimens that established the drug's botanical position.

DR. RUSBY: This matter is an exceedingly interesting one, but Prof. Lloyd has not touched upon one aspect of it, which, I think, is perhaps of more interest than any other, namely, the question whether the original *Cascara Sagrada*, on which the drug gained its first prominence, was the *Rhamnus Purshiana* or *Rhamnus Californica*. I supposed for some years that there was no doubt about this, but for the last ten years the more I have looked into the history of *Cascara Sagrada*, the more I have come to think it possible that the first bark was in reality the bark of *Rhamnus Californica*, and that afterwards the bark of *Rhamnus Purshiana* was substituted for it. *Rhamnus Californica* is found where Dr. Bundy worked and probably collected it: the other is found only in the north of California. This question, I think, still requires investigation. I am not prepared to express an opinion about it at this moment, but it is a matter worthy of investigation.

In this connection I might say that during the past year I secured a considerable quantity of bark, both of *Rhamnus Purshiana* and *Rhamnus Californica*, and this is at the service of the Research Committee, if they desire to investigate the two barks, compare them thoroughly with each other, and afterwards submit them for therapeutical investigation. It may be possible that the Pharmacopoeia could introduce both these barks under one definition, and allow either one or the other to be used.

MR. LLOYD: I think Dr. Rusby has already given a paper on the differentiation of the two barks.

DR. RUSBY: I refer to the chemical and therapeutical activity of the two barks.

The next paper was read by Mr. Kremers.

#### THE MENTHOL GROUP. IV.

W. O. RICHTMANN\* AND EDWARD KREMERS.

In connection with the study of the nitrosochlorides of menthene, several observations have been made with regard to the melting point of the same, that appear grossly inconsistent.

Sieker, who first prepared the nitrosochloride of menthene, stated that it melted at  $113^{\circ}\text{C}$ .† Other observations made in this laboratory seem to indicate that the melting point is somewhat higher. The highest melting point of the nitrosochloride of menthene yet obtained in this laboratory was observed by Mr. Urban, it was that of a purified compound melting at  $128^{\circ}\text{C}$ .‡

In addition to these deviations, Bayer has made the statement that the hydrocarbon  $\text{C}_{10}\text{H}_{18}$ , prepared from a tertiary menthol yields "dasselbe bei  $146^{\circ}\text{C}$ . schmelzende nitrosochlorid wie gewöhnliches menthen."§

It would seem that either the observations made in this laboratory were on impure material, or that Bayer's nitrosochloride of menthene differs somewhat, though only stereometrically, from the nitrosochloride of menthene, prepared from menthene, that was obtained by the dehydration of menthol.

Since the observations made in this laboratory were based upon material obtained at different times, sometimes only in very small quantities, also from menthene prepared with the aid of different dehydrating agents, it seemed very desirable, in order to prevent the multiplication of similar incongruities, to make a fundamental study of the physical constants of menthene and its nitrosochloride.

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\* Fred. Pabst Fellow in Pharmaceutical Chemistry.

† Am. Chem. Journal, Vol. XIV., p. 292.

‡ Am. Chem. Journal, Vol. XVI., p. 395.

§ Ber. d. chem. Ges. 26, p. 2561.

## PREPARATION OF MENTHENE.

*A.* Mr. Helbing\* prepared menthene by dehydrating menthol with anhydrous copper sulphate in the following manner: Five hundred grams of menthol and seven hundred and fifty grams of anhydrous copper sulphate were heated in a copper flask, connected with a reflux condenser over a free flame, for from eight to ten hours. The resulting mixture was distilled with water vapor. The oily layer of the distillate after separation by means of a separatory funnel, was dried with anhydrous copper sulphate and then fractionated six different times.

The first fractionation was in fractions of five degrees each; the second, third and fourth fractionations of one degree each; and the fifth and sixth fractionations of one-half degree each. In all but the first fractionation, when an ordinary distilling bulb was used, a column after Loebel and Henninger was employed.

*B.* The menthene employed by W. R.† in the second series of experiments, was prepared by the dehydration of menthol in the following manner: One hundred grams of menthol and two hundred grams of acid potassium sulphate coarsely powdered were heated together in a round-bottom flask, connected with a reflux condenser, for from ten to twelve hours in a paraffin bath at a temperature of 180°–200°C. The mixture thus obtained was treated in the same manner as that obtained by Mr. Helbing, as was also the resulting menthene.

*C.* In a third series of experiments, menthene was obtained with anhydrous copper sulphate as dehydrating agent, as given under *A* of this paper. This process of dehydration was employed, now that sufficient data of the physical constants of menthene had been obtained, (1) because of the larger quantities used with greater ease of manipulation; (2) the more complete dehydration of the menthol at each dehydration, and (3), the greater percentage yield of menthene.

Inasmuch as the principal object in this series of experiments was to obtain a larger quantity of  $\frac{4}{3}$  Terpene-3-one, the fractionation of the menthene was not conducted with any particular care. The fractional crystallization of the nitrosochloride of menthene, however, was of some interest, and the results will therefore be recorded.

The changes in the fractions of the menthene obtained by the two previously mentioned processes, during the last three fractionations, as indicated by boiling point, specific gravity, rotatory power, and yield, are in the following table:

\* Graduation Thesis. Nitrosochloride of menthene and some of its derivatives. 1894.  
Not published.

† Graduation Thesis. Unpublished results.



TABLE 1.

FOURTH FRACTIONATION.					FIFTH FRACTIONATION.					SIXTH FRACTIONATION.				
b. p.	sp. gr.	$\alpha$ .	$[\alpha]_D$	Yield.	b. p.	sp. gr.	$\alpha$ .	$[\alpha]_D$	Yield.	b. p.	sp. gr.	$\alpha$ .	$[\alpha]_D$	Yield.
A.-165°					-165°					-165°				
165°					165°-165.5°					165°-165.5°				
166°					165.5°-166°					165.5°-166°				
166°	0.8130			3.1 per cent.	166°-166.5°					166°-166.5°				
167°					166.5°-167°	0.8140	+22.60°	+27.76°	1.7 per cent.	166.5°-167°				
167°					167°-167.5°	0.8113	+24.05°	+29.60°	2.3 per cent.	167°-167.5°				
168°	0.8123	+24.30°	+28.83°	16.5 per cent.	167.5°-168°	0.8118	+24.01°	+29.57°	15.7 per cent.	167.5°-168°	0.8118	+24.48°	+30.17°	14.1 per cent.
168°					168°-168.5°	0.8123	+23.81°	+29.34°	12.7 per cent.	168°-168.5°	0.8130	+24.20°	+29.76°	11.0 per cent.
169°	0.8128	+22.01°	+27.08°	17.8 per cent.	168.5°-169°	0.8130	+22.67°	+27.89°	7.1 per cent.	168.5°-169°	0.8148	+23.41°	+28.73°	2.1 per cent.
B.-165°					-165°					-165°				
165°					165°-165.5°					165°-165.5°				
166°	0.8103	+23.91°	+29.51°	15.4 per cent.	165.5°-166°					165.5°-166°				
166°					166°-166.5°	0.8106	+23.75°	+29.30°	3.2 per cent.	166°-166.5°	0.8103			5.2 per cent.
167°	0.8113	+23.93°	+29.50°	15.1 per cent.	166.5°-167°	0.8106	+23.88°	+29.46°	5.1 per cent.	166.5°-167°	0.8103	+23.98°	+29.60°	7.4 per cent.
167°					167°-167.5°	0.8114	+23.93°	+29.49°	13.3 per cent.	167°-167.5°	0.8113	+24.04°	+29.63°	15.1 per cent.
168°	0.8136	+23.48°	+28.86°	8.9 per cent.	167.5°-168°	0.8117	+23.80°	+29.34°	14.7 per cent.	167.5°-168°	0.8117	+24.08°	+29.66°	12.0 per cent.
168°					168°-168.5°	0.8125	+23.45°	+28.86°	12.2 per cent.	168°-168.5°	0.8125	+23.88°	+29.39°	5.7 per cent.
169°	0.8147	+22.67°	+27.82°	12.8 per cent.	168.5°-169°	0.8140	+22.96°	+28.81°	4.3 per cent.	168.5°-169°	0.8135	+23.90°	+28.76°	2.7 per cent.

In this table, as in all of those that are to follow, it is to be understood that the specific gravity and rotatory power were taken at a temperature twenty degrees Centigrade, and the latter in an hundred millimeter tube ; unless otherwise stated. The atmospheric pressure as observed during the last three fractionations, by means of a mercury barometer, was as follows :

TABLE II.

No. of Fract.	A.	B.
4.....	735 Mm.	735 Mm.
5.....	734 "	735 "
6.....	739 "	739 "

## MENTHENE NITROSOCHLORIDE.

All of the menthene nitrosochloride was prepared according to the following formula. Forty-five cubic centimeters of menthene, forty-five cubic centimeters of glacial acetic acid, and thirty-three cubic centimeters of ethyl nitrite, were mixed in an Erlenmeyer flask, which was placed in a freezing mixture. While the flask is constantly being shaken in the freezing mixture, a solution of eighteen cubic centimeters of concentrated hydrochloric acid in an equal volume of glacial acetic acid is allowed to enter the flask, drop by drop, from a separatory funnel. After all of the acid in the funnel has entered the flask, the entire mixture in the flask is shaken continuously for about fifteen minutes, when it is packed in a freezing mixture and allowed to remain for an hour.

The crystals which have formed during this time are now filtered off by means of a force filter, and the mother liquid is returned to the cold for the separation of more crystals. After having remained in the freezing bath during the night, the second crop of crystals is removed and the mother liquid returned to the cold as before. In the course of a week or two a third, and sometimes even a fourth crop of crystals may be obtained.

Each crop of crystals after having been well drained on a force filter, is washed successively with small quantities of alcohol to remove the last portions of the mother liquid. The crystals are dried on porous plates. The yield of the various crops, together with the physical constants of each, are given in the following table :

TABLE III.

No. of Crop.	B. P. of Menthene.	M. P.	$[\alpha]_D$ .	Yield.
A. 1.....	166.5°-167.0°			
1.....	167.0°-167.5°			
1.....	167.5°-168.0°	113°-114°	+ 20.64°	21.11 per cent.
1.....	168.0°-168.5°	107°-108°	.....	21.99 "
1.....	168.5°-169.0°			
2.....	166.5°-167°			
2.....	167.0°-167.5°			
2.....	167.5°-168.0°	106°-107°	.....	3.05 per cent.
2.....	168.0°-168.5°	109°-110°	.....	4.50 "
2.....	168.5°-169.0°			
3.....	All.	114°-115°	.....	3.05 per cent.
4.....	All.			
B. 1.....	166.5°-167.0°	112°-113°	+ 9.65°	27.36 per cent.
1.....	167.0°-167.5°	112°-113°	+ 9.84°	24.41 "
1.....	167.5°-168.0°	112°-113.5°	+ 8.26°	22.56 "
1.....	168.0°-168.5°			
1.....	168.5°-169.0°			
2.....	166.5°-167.0°	107°-108°	Inactive.	2.67 per cent.
2.....	167.0°-167.5°	107°-108°	Inactive.	4.34 "
2.....	167.5°-168.0°	108°-109°	Inactive.	5.05 "
2.....	168.0°-168.5°			
2.....	168.5°-169.0°			
3.....	All.	115°-116°	Inactive.	4.31 per cent.
4.....	All.	116°-117°	Inactive.	3.27 "
C. 1.....	All.	112°-113°	+ 7.234°	21.21 per cent.
2.....	All.	113°-115°	Inactive.	4.80 "
3.....	All.	115.5°-117°	Inactive.	3.00 "
4.....	All.			

In order to purify the menthene nitrosochloride thus obtained, it was precipitated from its chloroformic solution by means of alcohol. Eighteen grammes of the menthene nitrosochloride were dissolved in ninety grammes of chloroform. The solution was filtered and then thirty grammes of alcohol were added to the filtrate. The resulting mixture was shaken frequently during ten minutes, and then the precipitated menthene nitrosochloride was filtered off with the aid of a force filter. Thirty grammes of alcohol were again added to the filtrate and the process was repeated as before.

After the second crop had been removed, the filtrate was placed under the blast to evaporate for two hours. The crystals which separated were removed as before. From this filtrate, still a fourth crop separated upon standing forty-eight hours. Each crop of crystals after draining for some time on a force filter, was washed with a small quantity of alcohol, and after draining again, was placed upon a porous plate to dry.

In the table below the yield and physical constants of each crop are given. The specimens *A* were obtained from the first crop of menthene nitrosochloride that had been prepared from menthene boiling at 167.5°–168.0° C., while the others *B* were obtained from the first crop of menthene nitrosochloride that had been prepared from menthene boiling at 167.0°–167.5° C.

TABLE IV.

Crop.	M. P.	$[\alpha]_D$ .	Yield.
A. 1.....	113.0°–114.0°	+ 1.015°	33.47 per cent.
2.....	108.5°–109°	+16.715°	26.39 "
3.....	110.0°–111°	+31.234°	16.61 "
4.....	113.5°–115°	....	2.77 "
B. 1 .....	121.0°–122.0°	– 2.4508°	32.44 per cent.
2.....	118.0°–119.0°	+ 3.7556°	19.52 "
3.....	117.0°–118.0°	+16.4434°	24.02 "
4.....	117.0°–118.0°	....	1.17 "

It becomes evident from these figures that the menthene nitrosochloride when prepared by the process previously given (page 203) is a mixture. Possibly the menthene from which it is prepared is itself a mixture.

It is remarkable that the first fraction (*B*), which is slightly laevogyrate, has a higher melting point than any of the other fractions; also that the second and third fractions, although differing widely in rotatory powers, differ but slightly in their melting points.

As the quantity of laevogyrate nitrosochloride of menthene, obtained in series *B*, was very small, the same experiments were continued in series *C*, as follows. The second crop (Table III.), being entirely inactive, it was thought that perhaps it might be a mixture of some quite strongly dextrogyrate and much more or less strongly laevogyrate nitrosochloride of menthene. The process for fractional crystallization as given on page 204 was employed with the following results:

TABLE V.

Fraction.	M. P.	$[\alpha]_D$ .	Yield.
C. 1.....	115.5°–116°	Inactive.	18.21 per cent.
2.....	114.0°–114.5°	Inactive.	22.24 "
3.....	114.0°–114.5°	Inactive.	12.96 "
4.....	112.5°–113.0°	Inactive.	8.48 "
5.....	118.0°–119°	Inactive.	4.65 "

As all of the fractions thus obtained are inactive, either the nitrosochloride is composed of inactive molecules, or, if it is a mixture of dextro and lævogyrate nitrosochlorides as was supposed, then the process for fractional crystallization as given above does not serve to isolate the two forms.

The same experiment was now tried on an optically active nitrosochloride of menthene, viz. Crop 1. Table III.

TABLE VI.

Fraction.	M. P.	$[\alpha]_D$ .	Yield.
1.....	121.5°-122.5°	-0.9784°	18.60 per cent.
2.....	121.0°-122.0°	+0.9304°	10.25 "
3.....	119.5°-120.0°	+1.7506°	11.80 "
4.....	116.0°-117.5°	+0.5763°	29.80 "

In Table V. and VI. it is to be noticed that there is a gradual falling off of the melting points from the first to the fourth fractions; and in Table V. a very sudden rise in melting point occurs in the fifth fraction, above the fourth fraction. A fifth fraction was not obtained in Table VI., and consequently no observation for a like phenomenon could be made.

The first fraction of Table VI. was slightly lævogyrate, which was the variety much sought after, was too small in amount to work with; only about 65 per cent. of the substance used recrystallized during this process. The experiment could not be repeated, as the remainder of Crop I., Table III. had already been employed in the preparation of nitrosomen-thene.

These experiments indicate the presence of two, and possibly three, nitrosochlorides of menthene when prepared by the process given on page 203.

The two known forms are the dextro- and lævogyrate nitrosochlorides, while the third may be composed of inactive molecules, or the mixture of dextro- and lævogyrate forms previously spoken of, but for the separation and isolation of which no satisfactory method has yet been found.

#### MENTHENE NITROL BENZYLAMINE.

A. The three purified fractions of menthene nitrosochloride (Table III) were converted into the benzylamine base. Five grams of each of the fractions, with five and one-quarter grams of benzylamine and thirty cubic centimeters of alcohol, were heated in a round-bottom flask, connected with a reflux condenser, on a water bath until solution was effected. The solutions were filtered and then set aside to crystallize. The crystals were separated from the mother-liquid, and then recrystallized from alcohol. The melting-points of the purified products, thus obtained, were found to be 106.5°, 105.5°, and 105.5° respectively. In an approximately five per cent. solution, each was found to be optically inactive.

It is of interest to note that the menthene nitrosochlorides differing by at least thirty degrees, should all yield an optically inactive benzylamine base. It would be less surprising if the inactivity had occurred in the dehydration of menthol to menthene or in the preparation of the nitrosochloride from the latter.

## NITROSO-MENTHENE.

Nitroso-menthene was prepared by heating fifty grams of menthene nitrosochloride with two hundred and fifty cubic centimeters of a ten per cent. alcoholic potash solution, in a round-bottom flask connected with a reflux condenser, on a water bath for from one to one and a half hours. The resulting mixture was filtered, and the residue washed with alcohol to remove all the soluble portion. Water was now added to the filtrate to precipitate the nitroso-menthene. The mixture was allowed to stand for twelve hours. The yellow flocculent precipitate, which had risen to the surface, was collected, washed with a small quantity of dilute alcohol, and drained with the aid of a force filter.

The nitroso-menthene thus obtained was very impure, and was purified by *A*, two recrystallizations from hot alcoholic solution; *B*, distillation with water vapor, and collected in fractions.

No determination of the physical constants of the purified nitroso-menthene *A* were made. Those of the four fractions of *B* are given in

TABLE VII.

Fraction.	M. P.	$[\alpha]_D$ .	Yield.
1.....	62°-64°	-9.123°	About 25 per cent.
2.....	63.5°-64.5°	-3.655°	" "
3.....	64.0°-65.0°	-4.683°	" "
4.....	64.5°-65°	-4.7915°	" "

The first and second fractions were impure, as shown by their color, which was somewhat yellowish, while the third and fourth fractions were pure white; also by their somewhat lower melting points, and varying specific rotatory power.

It was of interest to know whether the differences in the physical constants of menthene nitrosochloride would cause similar differences in those of the nitroso-menthene. In order to make these observations, nitroso-menthene was prepared from the purified menthene nitrosochloride (see Table IV.). The resulting observations are given in the following tables—Table VIII. giving the physical constants of the nitroso-menthene before, and Table IX., after recrystallization from alcohol.

TABLE VIII.

Fraction.	M. P.	$[\alpha]_D$ .	Yield.
1.....	67°-68°	-1.253°	86.5 per cent.
2.....	67°-68°	-3.186°	85.9 "
3.....	66.5°-67.5°	-6.717°	85.2 "

TABLE IX.

Fraction.	M. P.	$[\alpha]_D$ .	Yield.
1.....	67.0°-67.5°	-6.414°	47.8 per cent.
2.....	67.0°-67.5°	-10.225°	49.2 "
3.....	66.5°-67.0°	-10.148°	48.7 "

A comparison of Tables IX. and IV. shows that the difference in melting point is practically lost; but, that the sign of rotation of the menthene nitroschlorides is reversed in splitting off the hydrochloric acid; and that the greater the "plus" rotation of the nitroschloride, the greater the "minus" rotation of the nitrosomenthene.

C. An inactive nitrosomenthene was obtained from inactive menthene nitroschloride (Table V.). The melting point was the same as that of optically active variety, viz. 65°-66°. The same process as given under B was employed.

#### MENTHYLAMINE NITRATE.

The menthylamine was prepared by the reduction of nitrosomenthene with acetic acid and zinc dust. The nitrate of the base was separated by means of sodium nitrate, but for some reason, only a very small quantity was obtained (about ten grammes from one hundred grammes of nitrosomenthene). This was too small a quantity to proceed with, for experimentation on the alcohol  $C_{10}H_{18}O$ , which compound we had expected to obtain from the menthylamine nitrate.

#### KETONE. $C_{10}H_{18}O$ .

Fifteen (15) grammes of purified nitrosomenthene were dissolved in thirty (30) cubic centimeters of concentrated hydrochloric acid, to which was added thirty (30) cubic centimeters of water. The mixture was heated in a round bottom flask, connected with a reflux condenser, on a water bath, for fifteen minutes, until the oily layer ceased to separate. The mixture was distilled with water vapor. The purified oil was separated from the water and then dried with anhydrous sodium sulphate. The oil was of a light straw-color, but became darker very rapidly upon

standing, and had a decided minty odor. The physical constants of the oil are given in the following table :

TABLE X.

B. P.	Yield.	Sp. Gr.	$\alpha$ .	$[\alpha]_D$ .
-205°	6.3 per cent.			
205°-206°	10.0 "	0.9148		
206°-207°	37.1 "	0.9157	-1.2063°	-1.3173°
207°-208°	40.2 "	0.9163	-1.2083°	-1.3189°
208°-210°	1.2 "			
210°-212°	1.6 "			
212°-215°	1.2 "			
215°-218°	0.8 "			
218°- +	1.4 "			

The inactive nitrosomenthene, obtained from the inactive menthene nitrosochloride, was also converted into the ketone. The physical constants of the main fraction together with those of the corresponding fraction of the ketone from the general source.

TABLE XI.

Source.	B. P.	Sp. Gr.	$\alpha$ .	$[\alpha]_D$ .
Mixt. NOCl's .....	207°-208°	0.9163	-1.2063°	-1.3173°
Inact. NOCl .....	207°-208°	0.9159	+0.3938°	+0.4299°

A slight difference in specific rotatory powers will be noticed, the one being dextro- and the other laevo-rotate.

Upon comparison, it will be seen that the boiling point of this ketone  $C_{10}H_{16}O$ , as given above, is somewhat lower than that observed by Kremers and Urban. They found the boiling point to be 210°-212°, but worked with much smaller quantities.

The boiling point of this ketone,  $C_{10}H_{16}O$ , is but a few degrees higher than that of menthone (204°-205° C), the corresponding ketone richer by two (2) hydrogen atoms.

#### KETONE HYDROSULPHIDE.

Crystals of the hydrosulphide were very easily obtained by passing hydrogen sulphide into a solution of the ketone (1 volume) in alcohol (4 volumes) and the subsequent addition of strong ammonia water. Upon standing for twelve hours very fine needles had separated. These were separated by means of a force filter, washed with alcohol, and then dried



on porous plates. The melting point of the crystals was  $212^{\circ}$ – $215^{\circ}$ . They were soluble in chloroform and hot methyl alcohol, slightly soluble in ether, benzol, petroleum ether, and hot ethyl alcohol. The mother liquid, which possessed a decided buchu odor, was set aside for further crystallization. Two more crops of crystals were obtained. The melting point of each was lower than the preceding one.

The several crops were mixed and dissolved in chloroform and allowed to crystallize. When dried they melted at  $206^{\circ}$ – $208^{\circ}$ . A sulphur determination gave the following results :

0.2786 gms. substance yielded 0.5802 gms. $\text{BaSO}_4$ = 0.0796 gms. S. = 28.57 per cent.	
Calculated for	Found
$\text{C}_{10}\text{H}_{18}\text{O}_2\text{H}_2\text{S}$ - 17.205 per cent.	28.57 per cent.
$\text{C}_{10}\text{H}_{18}\text{O}_2\text{H}_2\text{S}$ - 29.050 per cent.	

The result, although somewhat low, is decidedly in favor of the addition of two molecules of hydrogen sulphide.

#### NITROSO DERIVATIVE OF KETONE.

Bayer's formula for the preparation of nitroso pulegone was employed, but did not give a very large yield. Two (2) cubic centimeters of the oil were dissolved in an equal volume of petroleum ether (B. P.  $65^{\circ}$  C.) and then 1 Cc. of ethyl nitrite added. The mixture contained in a test tube is immersed in a freezing mixture, and stirred with a glass rod, which had been dipped in concentrated hydrochloric acid. After stirring for fifteen minutes the mixture was allowed to remain in the freezing mixture for another fifteen minutes, when the white amorphous precipitate which had formed was removed with the aid of a force filter. After drying it melted at  $115$ – $115\frac{1}{2}^{\circ}$  with slight decomposition, as shown by the compound turning brown. The yield was so small that no other work could be done with the compound.

#### KETONE AND PHENYLHYDRAZINE HYDROCHLORIDE.

The hydrazone of the ketone was very easily prepared by dissolving five cubic centimeters of the oil in twelve and a half cubic centimeters of alcohol, and then six and five hundredths grammes of phenylhydrazine hydrochloride and an excess of sodium bicarbonate added. Upon standing over night without heating or heating with a reflux condenser, on a water-bath for fifteen minutes, and then cooling, the entire mass crystallized.

To purify the crystals they were dissolved in warm alcohol and allowed to recrystallize. Decomposition occurred so rapidly that only a very small quantity was obtained, which had a melting point of  $73\frac{1}{2}^{\circ}$ – $74^{\circ}$ , with slight decomposition and evolution of a colorless gas. Upon cooling, the substance in the tubes was of a bright-green color. When remelted no further change was noticed. It melted at  $72\frac{1}{2}^{\circ}$ – $73^{\circ}$ , and became green upon cooling. Fischer's precaution that in determining the melting points of

hydrazones they should be heated rapidly in order to avoid error, was carefully observed.

To obtain larger quantities for combustion purposes, a modification of the above method of preparation was adopted. The hot alcoholic solution, after being filtered, was gradually diluted with water until a slight turbidity resulted. After standing fifteen minutes a large quantity of fine silky crystals had separated. These were removed with the aid of a force filter, washed with dilute alcohol, drained and dried. M. P.  $73\frac{1}{2}^{\circ}$ – $74^{\circ}$  C. The crystals decomposed within twenty-four hours with the evolution of gas. A spongy, dark green resinous mass remained.

The pure crystals gave the following results for nitrogen with the Will and Varrentraap method :

A–0.2348 gm. yielded 0.02387 gm. N = 10.15 per cent.

B–0.2330 gm. yielded 0.02352 gm. N = 10.095 per cent.



Calculated.	Found.	
N	I	II
11.57 per cent.	10.15 per cent.	10.095 per cent.

Although somewhat too low, the above figures indicate that the formula  $\text{C}_{10}\text{H}_{16} : \text{N.NH.C}_6\text{H}_5$  is correct, and that a hydrazone is formed.

It was also tried to determine the nitrogen by means of the Kjeldahl method, but no satisfactory results were obtained. E. Lawes \* finds that contrary to previous reports, nitrogen in glucozone, phenylhydrazine, and antipyrin cannot be determined with the Kjeldahl method.

#### KETONE AND SUBSTITUTED PHENYLHYDRAZINES.

By using substituted phenylhydrazines it was hoped to obtain a more stable compound with ketone, and the following were tried : (a) Acetyl-phenyl hydrazine hydrochloride ; (b) Ortho-toluy phenylhydrazine hydrochloride ; (c) Para-toluy phenylhydrazine hydrochloride.

Both processes given under  $\Delta$ , Terpene hydrazone were tried with each substance. However, no positive results were obtained.

#### KETONE AND NITROSOCHLORIDE REACTION.

An attempt was made to prepare a nitrosochloride of the ketone, it having a double bond,  $\Delta$ , in the ring. The formula used in preparing menthene nitrosochloride was employed. Several trials resulted in negative results. During the experiments nitrous acid fumes were given off.

#### REDUCTION OF KETONE.

In order to reduce the ketone, Beckman's process was employed.

\* Chem. Centralblatt, 1892, Vol. II, p. 628.

Fifteen (15) cubic centimeters of the oil (B. P.  $207^{\circ}$ ,  $208^{\circ}$ ) were dissolved in fifty (50) cubic centimeters of anhydrous ether. Metallic sodium in excess was gradually added and the mixture heated in a flask with a reflux condenser, on a water bath for four (4) hours. The liquid portion, upon cooling, was decanted, and the residue washed with several successive portions of ether. Both portions of ether were placed in a separatory funnel and an equal volume of water added, the mixture was shaken occasionally, and placed in a cool place during half an hour. The ethereal layer was then separated and allowed to evaporate spontaneously. Small white crystals formed; these were separated from the reddish brown oil, which had a decided minty odor.

The oil was again heated in the same manner as above, excepting that instead of allowing the ethereal solution to evaporate, it was distilled with water vapor. The first portion which came over was entirely ether. The oil which distilled over was collected, dried and exposed to a freezing mixture. Nothing separated. The oil was light yellow in color and of a minty odor.

A very heavy reddish-brown gummy residue remained in the distilling flask. It readily dissolved in hot alcohol, and from which solutions crystals began to separate after standing several months.

None of the above compounds were obtained in sufficient quantities to work with. The experiment was repeated on a larger scale (using 150 Cc. of the ketone and corresponding quantities of the other substances) and petroleum ether (B. P.  $65^{\circ}$ ,  $70^{\circ}$  C.) was used as the solvent. The same results were obtained as with the use of anhydrous ether, only that crystals separated from the hot methyl alcohol solution of the gummy residue very readily.

#### OILY PORTION.

The oil, which had a specific gravity of 0.9019 and  $[\alpha]_D - 0.8144^{\circ}$ , was fractionated (see Table XII.). Most of it distilled over between  $207^{\circ}$ – $208^{\circ}$  C., which fraction was colorless, and of a minty odor. It is to be observed that this compound differs very slightly in its physical constants from those of the original ketone.

#### MOLECULAR COEFFICIENT OF REFRACTION.

This physical constant was determined by means of a Pulfrich's Total-refractometer, and calculated from the following formula, according to Lorentz, for the coefficient ( $R = \frac{n^2 - 1}{(n^2 + 2)d.}$ ) of refraction, in which  $n$  = index of fluid examined, obtained from tables of refractometer, from angles read.

d. = density of fluid examined.

R = coefficient of fluid examined.

M = molecular weight of fluid examined.

M R = molecular coefficient of fluid examined.

Observed,  $n = 1.466921$  ( $20^{\circ}$  C.).

$d = 0.9103$

then  $R = 0.304769824$ .

$M$ , in the case of the supposed alcohol = 154.

$M$ , in the case of the original ketone = 152.

then  $MR = 46.93$  for the alcohol.

then  $MR = 46.36$  for the ketone.

The factors used in determining the molecular refraction according to Conrady are :

1. C (in C—C) = 2.501
2. C (in C=C) = 1.707 additional
3. O (in O—H) = 1.521
4. O (in C=O) = 2.287
5. H ( ) = 1.051

From these factors the calculated molecular refraction would be :

Alcohol.		Ketone.	
$C_{10}$ (1) 25.01		$C_{10}$ (1) 25.01	
(2) 1.707		(2) 1.707	
$H_{18}$ (5) 18.908		$H_{18}$ (5) 16.816	
O (3) 1.521		O (4) 2.287	
<u>47.146</u>		<u>45.820</u>	
	Alcohol.		Ketone.
Calculated .....	47.46		45.820.
Determined .....	as 46.935		as 46.325.

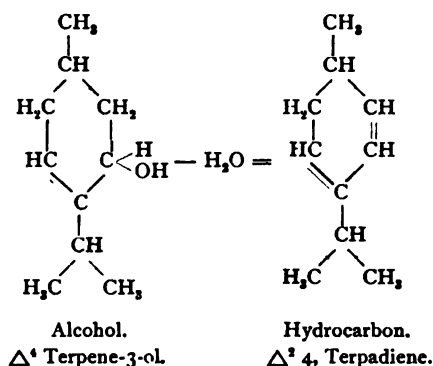
The figures seem to be in favor of the alcohol formula, but they do not vary greatly from the calculated results, for the ketone. Chemical reactions seem to indicate that the supposed alcohol consists mainly of unchanged ketone.

#### DEHYDRATION OF ALCOHOL $C_{10}H_{18}O$ .

The supposed alcohol was heated the same as under B in the dehydration of menthol. The resulting oil, when fractionated, distilled over for the greater part between  $204^{\circ}$ – $206^{\circ}$  C., which fraction had a sp. gr. of 0.9100, and  $[\alpha]_D^{20} = -1.3919^{\circ}$ . All of the fractions were colorless and possessed a minty odor.

## NITROSOCHLORIDE REACTION.

The above compound, which was supposed to be the hydrocarbon  $C_{10}H_{16}$  ( $\Delta^2$ , 4, terpadiene) according to the following equation,



was treated with ethyl nitrite, concentrated hydrochloric acid, and glacial acetic acid, but no crystals were obtained upon several repeated trials.

Combustions of the oil gave the following results :

A. 0.2147 Gms. substance yielded :

0.5918 Gms.  $\text{CO}_2$  = 0.1614 Gms. C = 75.13 per cent. C.

0.20750 "  $\text{H}_2\text{O}$  = 0.02305 " H = 10.74 per cent. H.

B. 0.1991 Gms. substance yielded :

0.5210 Gms.  $\text{CO}_2$  = 0.1421 Gms. C = 71.39 per cent. C.

0.1925 "  $\text{H}_2\text{O}$  = 0.0214 " H = 10.75 per cent. H.

C. 0.1909 Gms. substance yielded :

0.5228 Gms.  $\text{CO}_2$  = 0.1426 Gms. C = 74.70 per cent. C.

0.1848 "  $\text{H}_2\text{O}$  = 0.0205 " H = 10.77 per cent. H.

Calculated for	Found.		
$C_{10}H_{16}$	I.	II.	III.
C — 88.24 per cent.	75.13 per cent.	71.39 per cent.	74.70 per cent.
H — 11.76 per cent.	10.74 per cent.	10.75 per cent.	10.77 per cent.

That the oil cannot be a hydrocarbon is certain from the above figures, since they admit of nearly fifteen per cent of oxygen.

Another proof is that both an oxime (M. P.  $67^\circ$ – $68^\circ$  C.), and a hydro-sulphide (M. P.  $212^\circ$ – $214^\circ$ ) were obtained.

## CRYSTALS OBTAINED DURING PROCESS OF REDUCTION OF KETONE.

The several lots of crystals which separated showed varying melting points. All were therefore recrystallized from hot methyl alcohol when they showed a melting point of  $160^\circ$ – $162^\circ$  C. Upon analysis the following results were obtained :

A. 0.2445 Gms. substance yielded :

0.6451 Gms.  $\text{CO}_2$  = 0.1759 Gms. C = 71.96 per cent. C.

0.2384 "  $\text{H}_2\text{O}$  = 0.0265 " H = 10.82 per cent. H.

B. 0.2024 Gms. substance yielded :

0.5297 Gms.  $\text{CO}_2$  = 0.14445 Gms. C = 71.86 per cent. C.

0.1993 "  $\text{H}_2\text{O}$  = 0.02215 " H = 10.94 per cent. H.

A test for sodium was made, but no appreciable amount was found : 0.2213 Gms. after ignition left no perceptible residue. Wallach, in the reduction of carvene to dihydrocarveol obtains a pinacone.

These results agree neither with the formula for the alcohol  $\text{C}_{10}\text{H}_{17}\text{OH}$ , nor for the corresponding pinacone. Molecular weights of this substance will next be made. The investigation along other lines will also be continued.

*Pharm. Chem. Laboratory, University of Wisconsin.*

Mr. Stevens read the following paper on Wild Cherry Barks :

#### VALUATION OF WILD-CHERRY BARK.

(CONTRIBUTED BY THE COMMITTEE OF RESEARCH.)

BY A. B. STEVENS.

About eighteen months ago, Mr. J. N. Judy, Ph. C., class of 1895, made a few experiments under the writer's direction for the purpose of ascertaining the relative strengths of the thin green bark and the thick brown bark of the wild cherry. The method of assay used by Mr. Judy was as follows :

Ten Gm. of the ground bark is macerated in 100 Cc. of water for twenty-four hours, then distilled with direct flame, and the distillate containing the hydrocyanic acid is passed into a decinormal potassium-hydrate solution. The alkaline solution of potassium cyanide is then titrated with decinormal silver-nitrate solution.

Dr. A. R. L. Dohme (Pharm. Rundsch., Vol. XIII., p. 260), in his estimation of wild-cherry bark, followed the method used in the distillation of volatile oils by passing live steam directly into the flask containing the bark and the water. The distillate was received in a weak solution of potassium hydrate, a decigram of sodium chloride added, and then titrated with silver nitrate solution.

Before proceeding with the direct estimation of the bark, a number of experiments were made to ascertain the most satisfactory method of estimation. An alkaline solution of potassium cyanide was titrated, first by the addition of the decinormal silver nitrate solution to faint cloudiness ; second by the addition of a decigram of sodium chloride before titrating with the silver nitrate solution.

The following is the number of Cc. of the standard silver nitrate solution required in each case :

	With NaCl.	Without NaCl.
1st.....	10.7	10.6
2d .....	10.8	10.7
3d .....	10.7	10.6
4th .....	10.7	10.7
5th.....	10.8	10.7

From the above it appears that it is immaterial which method is employed, as there is practically no difference in the results or in the appearance of the permanent precipitate.

The third method tried was as follows: Ten Gm. of the ground bark were macerated for twenty-four hours in 100 Cc. of water in an 800 Cc. flask. The flask, with its contents, was connected with a good condenser, and heated to near the boiling point, when live steam was admitted through a tube to the bottom of the flask. The distillate from the condenser was carried through a tube to the bottom of a flask containing 10 Cc. of a decinormal silver nitrate solution and 20 Cc. of water. The flask was connected with a second flask containing 10 Cc. of the silver nitrate solution, to absorb any hydrocyanic acid that might pass through the first flask. The precipitate forms with the first portion of the distillate, and is complete in from 10 to 20 minutes. The excess of silver nitrate is estimated by Volhard's solution (see U. S. P., page 495). The process is most satisfactory, as may be seen by comparison of results from duplicate estimations as given in the following table.

There is very little choice between the first and the third method. The results obtained by both upon a solution of potassium cyanide were the same. In the third method we know that distillation is complete when, upon agitating the receiver, the distillate no longer produces a precipitate in the silver solution. This may be easily done without disconnecting if the connections are made with rubber tubing. I prefer to substitute ferric nitrate for the ammonio ferric sulphate, as directed by the U. S. P., for an indicator, as the ammonio-ferric salt in solution is rapidly reduced to the ferrous salt.

Duplicate estimations were made with each sample, and the results given for the purpose of comparison.

Mr. H. T. Smith, Ph.C., of the class of '96, made several estimations, using the third method. His results are given in order that a comparison may be made of the results obtained by different workers upon the same method.

Dr. Dohme very kindly sent me the samples which he estimated. I have added his results, as previously published. Four estimations were made upon each sample received from Dr. Dohme, two by the third method and two by the first method, this being the method used by Dr. Dohme. On comparing his results with those of the writer, it will be observed that they are higher in every case except one. I believe this is due to the fact that

his estimations were made nearly a year before those of the writer, and that wild cherry bark deteriorates with age. This statement is supported by the low per cent. found in numbers 18 and 19, which were old museum specimens.

## RESULTS OF ANALYSIS.

	Third Method.	First Method.	Dohme.
No. 1. Squibb, "Common Bark," old.			
a.....	0.0550	0.0610	0.0782
b.....	0.0604	0.0702	0.0831
No. 2. Muth, "Brown Bark."			
a.....	0.0728	0.0701	0.0636
b.....	0.0774	0.0701	0.0782
No. 3. G. L. & C., "Green."			
a.....	0.0979	0.097	0.1567
b.....	0.1060	0.103	—
No. 4. Squibb, "Young Bark."			
a.....	0.127	0.167	0.22
b.....	0.129	0.167	—
No. 5. Muth, "Virgin Bark."			
a.....	0.0901	0.097	0.1418
b.....	0.0874	0.103	—
No. 6. Lloyd, "Bark of Tree."			
a.....	0.0874	0.097	0.1760
b.....	0.1006	0.108	0.1736
No. 7. Lloyd, "Bark of Twigs."			
a.....	0.074	0.075	0.115
b.....	0.0715	0.086	0.117
No. 8. Lloyd, "Bark of Root."			
a.....	0.2697	0.3230	0.3423
b.....	0.2648	0.3084	0.3423
		Third Method.	
		Stevens.	Smith.
No. 9. Palmer, "Green," 2 to 3 Mm. thick.			
a.....	0.0970		0.0971
b.....	0.0942		0.0940
c.....	0.0942		0.0947
No. 10. Stearns, "Green," 1 to 2 Mm. thick.			
a.....	0.1153		0.1111
b.....	0.1127		0.1085
c.....	0.1153		0.1111
No. 11. L. & F., "Green," 1 to 2 Mm. thick.			
a.....	0.1344		0.135
b.....	0.1390		0.137
No. 12. Palmer, "Green," 1 Mm. thick.			
a.....	0.089		—
b.....	0.089		—
No. 13. Eberbach, "Brown," ½ Mm. thick.			
a.....	0.1127		—
b.....	0.1138		—



	Third Method.	
	Stevens.	Smith.
No. 14. Stearns, "Very Thin, Green."		
a.....	0.0847	—
b.....	0.0798	—
No. 15. Stearns, "Very Thin, Green."		
a.....	0.0663	—
b.....	0.0741	—
No. 16. Stearns, "Thin."		
a.....	0.135	—
b.....	0.129	—
No. 17. Stearns, "Brown."		
a.....	0.076	—
b.....	0.082	—
No. 18. Stearns, "Old, Thick," from Museum.		
a.....	0.0162	—
b.....	0.0189	—
No. 19. Stearns, "Old, Thick," from Museum.		
a.....	0.0054	—
b.....	0.0054	—
No. 20. H. J. Brown, "Thick Brown."		
a.....	0.0836	—
b.....	0.0782	—
No. 21. U. of M. Museum, "Fresh Green Bark."		
a.....	0.1214	—
b.....	0.1268	—
No. 22. Eli Lilly & Co., "Thick, Brown."		
a.....	0.061	—
b.....	0.043	—
No. 23. Erwin "Old Bark," from tree 16 inches in diameter.		
a.....	0.0690	—
b.....	0.0637	—
No. 24. Lloyd, "Bark of Root."		
a.....	0.269	—
b.....	0.264	—
No. 25. Lloyd, "Bark of Trunk."		
a.....	0.108	—
b.....	0.097	—
No. 26. Lloyd, "Bark of Twigs."		
a.....	0.075	—
b.....	0.086	—
No. 27. Worden, "Bark from Young Tree Trunk."		
a.....	0.081	—
b.....	0.084	—
No. 28. Worden, "Bark from Young Tree Twigs"		
a.....	0.163	—
b.....	0.167	—
No. 29. Worden, "Bark from Old Tree Trunk."		
a.....	0.0715	—
b.....	0.0715	—
No. 30. Worden, "Bark from Old Tree Twigs."		
a.....	0.105	—
b.....	0.106	—

	Third Method.	
	Stevens.	Smith.
No. 31. Tree 18 inches in diameter, "Bark of Root."		
a .....	0.0562	—
b .....	0.0663	—
No. 32. Tree 18 inches in diameter, "Bark of Trunk."		
a .....	0.0267	—
b .....	0.0162	—
No. 33. Tree 18 inches in diameter, "Bark of Twigs."		
a .....	0.0741	—
b .....	0.0562	—
No. 34. Tree 8 inches in diameter, "Bark of Root."		
a .....	0.2487	—
b .....	0.2487	—
No. 35. Tree 8 inches in diameter, "Bark of Trunk."		
a .....	0.1219	—
b .....	0.1111	—
No. 36. Tree 8 inches in diameter, "Bark of Twigs."		
a .....	0.164	—
b .....	0.164	—
No. 37. Tree 6 inches in diameter, "Bark of Twigs."		
a .....	0.127	—
b .....	0.132	—
No. 38. Tree 6 inches in diameter, "Bark of Trunk."		
a .....	0.129	—
b .....	0.129	—
No. 39. Tree 6 inches in diameter, "Bark of Root."		
a .....	0.1940	—
b .....	0.201	—
No. 40. Tree 6 inches in diameter, "Bark of Root."		
a .....	0.2277	—
b .....	0.2169	—
No. 41. Tree 6 inches in diameter, "Bark of Trunk."		
a .....	0.0847	—
b .....	0.0901	—
No. 42. Tree 6 inches in diameter, "Bark of Twigs."		
a .....	0.124	—
b .....	0.135	—

It would also appear from the results obtained that the bark from young trees is richer in glucoside than bark from old trees.

Results of analysis of bark collected from different parts of the same tree :

	Root.	Twigs.	Trunk.
Tree, 18 in. diameter .....	0.0614	0.0651	0.0214
Tree, 8 in. diameter .....	0.2487	0.1640	0.1165
Tree, 6 in. diameter .....	0.2223	0.1295	0.0874
Tree, 6 in. diameter .....	0.1957	0.1295	0.1290

From the preceding it further appears that bark procured from different parts of the same tree varies in strength, the degree of strength being represented by the parts in the following order: root, twigs and trunk.

This was also observed by Dr. Dohme (see Nos. 6, 7 and 8.) I am pleased to acknowledge my indebtedness to Messrs. F. Stearns & Co. and Eli Lilly & Co., for samples of bark. Also, to Mr. James Seymour, Ph. C., and E. C. Worden, Ph. C., for collection of bark from different portions of the same trees.

*Ann Arbor, Mich., July, 1896.*

Mr. Fennel read a paper on the examination of pharmacopœial products.

#### PRODUCTS OF THE UNITED STATES PHARMACOPŒIA.

BY CHAS. T. P. FENNEL.

At no time in the history of this Association has so much public attention been paid to the preparations of the Pharmacopœia as in the past year. Many will claim that it is of little import to the American Pharmaceutical Association to consider the causes and motives which influence this revival of experimentation and examination of pharmaceutical products, and yet upon second thought all will agree that the subject is worthy of the most thorough consideration.

The broadest law of being, of existence, of which every plant, animal or mind are like illustrations, is that growth arises from an ability in the individual to assimilate nutrition in excess of its expenditure; a making of profit out of the surroundings.

American pharmacy has gone through various stages of evolution, and has established for itself the position of an important factor in its own material development, as well as that of the public, and consequently the public becomes a party in interest, and it is but proper that the interests of both should be zealously guarded.

Admitting the power of control and regulation, it becomes the duty of the representatives of pharmacy as well as those of the public to decide upon and determine the terms and conditions upon which reciprocal relations shall exist. This may be a very easy or a very difficult task, depending largely upon the character and intelligence of the men entrusted with the problems.

Careful analysis of all pharmaceutical legislation demonstrates the fact that all enactments are in the nature of special legislation; ostensibly sought for the public good, but practically sought by pharmacists for their own protection. To what extent pharmacy has profited by legislation, is difficult to estimate; but none were quicker to appreciate the aim at protection than the public at large, and as a result we find that they have sought through their representatives such legislation as to promote their interests. All such legislation has been one of public sentiment fostered by the public press or that of selfish motives fostered by adverse interests. In this conflict for rights and protection, pharmacists have no right to com-

plain ; for we must all admit that legislators as a rule have tacitly admitted the superiority of intelligence of the representatives of pharmacy by adopting without question their own formed standard, the United States Pharmacopœia, in all enactments affecting quality of drugs.

The Pharmacopœia is therefore in the nature of a law. Law is defined as "An express command ; a fixed regulation" which fixed regulation all must know, conform to and obey ; properly carried out in a spirit of mutual protection.

The Pharmacopœia is nothing more than a collection of fixed regulations under specific conditions which all pharmacists should know, conform to and obey in a spirit of mutual protection to themselves and the public ; but under the common law of human nature it is but natural that a spirit of antagonism and opposition, should manifest itself and be productive of motives which are not conducive to harmony or progress in pharmacy. This opposition is not necessarily begotten by ignorance, but on the contrary may find its source in the minds of the most intelligent and educated of men. The outbursts of dissatisfaction are not always the result of unjust or oppressive action, but most frequently are inspired by selfish motives or by feelings of disappointment and resentment upon the part of those who have failed to meet the requirements of the law. In a government like our own "of the people, for the people, and by the people" so many influences are brought to bear, that we must expect to find the execution of the laws in the hands of those frequently less fitted for the position. This is equally true of all pharmacy laws, for the enactment of all laws affecting pharmacy is usually placed in the hands of a few, a so-called Board of about five members, and very frequently the responsibilities are vested in one person, and who usually do not owe their position to their moral or educational status.

This is especially true of those laws regulating purity and strength of drugs, and consequently the responsibilities of examination are very much increased, while at the same time the opportunities for fault-finding are more readily centered. The liberty of the citizen and the vindication of the law alike demand that the examiner should proceed with the utmost circumspection, to the end that the guilty may not escape nor the innocent suffer. His method should be subject to the closest scrutiny and should bear the test of hostile criticism from the acutest minds that a defense can summon. Under such a stimulus, it is not surprising that interesting problems should be presented, that pharmacopœial tests and methods of examination should be subjected to the closest scrutiny and *made to appear* wanting on questions that in former years were entirely ignored or but lightly considered. Antagonism on the one side does not necessarily beget interest on the other. The attack upon the Pharmacopœia offers an admirable pretext to avoid the true issue and makes its defense the salient feature of the investigation. It is true that the precautionary measures

controlling time and atmospheric influences upon drugs should not be considered lightly, but the non-observance of these factors by pharmacists should not invalidate the requirements of the United States Pharmacopœia. We must all admit that time, and with it atmospheric influences, exert their power upon all matter frequently to such an extent as to make this matter completely unfit for all purposes, and thereby causing monetary loss to the possessor. This principle is recognized in every mercantile calling and every merchant destroys or sacrifices such matters when the effects of time are apparent; perhaps not willingly, but because the purchaser possesses the faculty of differentiation between good and bad. Pharmacists on the other hand are not willing to recognize this principle as applying to their products, since they well know that the purchaser in this case does not possess the faculty of differentiation.

Ignorance is the subservient slave of cupidity, and upon this cupidity of the public pharmacists proclaim their superior intelligence. But when this cupidity loses its firmness through education and enlightenment, pharmacists seek to cover their failings by finding fault with the Pharmacopœia. The responsibility must be placed and the established authority of purity and strength answers the purpose. Admitting the high standard of educational qualification of the pharmacist, vouched for by legislation of pharmacy laws, and further admitting the power of atmospheric influences, there is no reason why pharmacists should not make every effort to maintain pharmacopœial standards of quality. As we all well know, many proclaim this an impossibility; and yet with the educational qualifications and intelligence of pharmacists, the proper exercise of judgment and diligence in the observance of precautionary measures, the realization of uniform quality should be assured. I maintain that pharmacopœial requirements can readily be met; but, since minds will differ, it becomes the duty of this Association to harmonize the apparently conflicting statements made in regard to the value of pharmacopœial standards. Intelligent consideration and discussion are the only weapons to be used, and the light of reason will establish the fact that the requirements of the Pharmacopœia are not beyond the scope of possibilities. Theory, reason, experience and common sense of the unbiased mind applied to the following preparations of the Pharmacopœia conclusively show the accuracy of pharmacopœial standards and the greater necessity of more strongly maintaining the present authority of quality, strength and purity.

*Acidum Phosphoricum Dilutum.*

The official preparation should contain 10 per cent by weight of absolute orthophosphoric acid and have a specific gravity of 1.057.

Twenty-one samples examined, varied in specific gravity from 1.022 to 1.105, and in percentage of absolute acid from 4.8 to 18.7. Only 2 lots were found of exactly official strength.

*Coccus.*

The Pharmacopœia limits the amount of ash to 5 per cent. in this drug.

Nine samples examined gave from 3-30 per cent. of ash, only 3 of the samples being within the official requirements.

*Liquor Plumbi Subacetatis.*

The Pharmacopœia demands that this solution shall have a specific gravity of 1.195 and require 25 Cc. of normal sulphuric acid for complete precipitation of 13.67 Gm. of the solution, indicating the presence of about 25 per cent of basic lead acetate.

Twelve samples examined were found below the official standard, as shown by the following results :

	Spec. Grav.	$\frac{1}{2}$ H <sub>2</sub> SO <sub>4</sub> .		Spec. Grav.	$\frac{1}{2}$ H <sub>2</sub> SO <sub>4</sub> .
1 .....	1.033	4.5 Cc.	7 .....	1.119	19.5 Cc.
2 .....	1.115	19 Cc.	8 .....	1.187	16 Cc.
3 .....	1.23	19.5 Cc.	9 .....	1.224	19 Cc.
4 .....	1.162	18 Cc.	10 .....	1.043	6 Cc.
5 .....	1.213	20 Cc.	11 .....	1.19	18.5 Cc.
6 .....	1.20	17.5 Cc.	12 .....	1.20	18.5 Cc.

*Liquor Potassii Arsenitis.*

When prepared strictly by the official formula Fowler's Solution should represent 1 per cent. of the official arsenous acid, corresponding to at least 0.988 per cent. of absolute arsenic trioxide.

Fourteen samples examined were found to vary in strength from 0.65 per cent. to 0.99 per cent. of As<sub>2</sub>O<sub>3</sub>. Only 4 of the samples contained above 0.95 per cent., while 5 contained less than 0.85 per cent. each.

*Spiritus Ætheris Nitrosi.*

The official preparation should have a neutral reaction and a specific gravity of 0.836-0.842. It should contain about 4.3 per cent. of ethyl nitrite and over 95 per cent. by weight of alcohol.

Examination of three samples revealed the following conditions :

	Reaction.	Spec. Grav.	Ethyl Nitrite.	Alcohol.
1 .....	Acid	0.9245	0.0 per cent.	50 per cent.
2 .....	Acid	0.9310	0.0 per cent.	71 per cent.
3 .....	Faintly acid	0.8359	3.01 per cent.	91 per cent.

*Spiritus Limonis.*

The official solution should contain at least 90 per cent. by volume of absolute alcohol, and have a specific gravity of about 0.7922.

The examination of four samples gave the following results :

	Spec. Grav.	Alcohol.	Foreign Coloring Matter.
1 .....	0.969	19 per cent.	Curcuma.
2 .....	0.883	63.25 per cent.	None.
3 .....	0.940	39 per cent.	Aniline.
4 .....	0.992	6.75 per cent.	None.

*Spiritus Menthe Piperitz.*

If properly prepared this liquid should have a specific gravity of about 0.8631, and contain 81.3 per cent. by weight of absolute alcohol.

Two samples examined were found below the official standard, and contained respectively 21 and 62 per cent. of absolute alcohol. The spec. grav. were 0.967 and 0.8824 respectively.

*Tinctura Ferri Chloridi.*

The official tincture should have a specific gravity of about 0.96175 and contains 13.6 per cent. of anhydrous ferric chloride, representing 4.69 per cent. of metallic iron. The absolute alcohol present amounts to about 58 per cent. by weight.

The following results obtained in the examination of fifteen samples show the preparation to have been made from solutions of ferric chloride, not properly standardized.

	Spec. Grav.	Alcohol.	Metallic Iron.
1.....	0.9759	57.7 per cent.	4.8 per cent.
2.....	0.9825	57.2 per cent.	4.5 per cent.
3.....	0.979	57.5 per cent.	4.85 per cent.
4.....	0.985	53.7 per cent.	5.0 per cent.
5.....	0.9785	56.1 per cent.	4.0 per cent.
6.....	0.968	56.7 per cent.	4.75 per cent.
7.....	0.991	52.6 per cent.	5.25 per cent.
8.....	0.964	56.7 per cent.	6.25 per cent.
9.....	0.974	56.1 per cent.	5.65 per cent.
10.....	0.925	66.3 per cent.	4.25 per cent.
11.....	0.965	60.0 per cent.	5.5 per cent.
12.....	0.969	59.5 per cent.	5.1 per cent.
13.....	0.971	56.5 per cent.	5.75 per cent.
14.....	0.991	54.8 per cent.	5.65 per cent.
15.....	0.978	55.0 per cent.	5.25 per cent.

*Tinctura Iodi.*

Official tincture of iodine should contain 7.86 per cent. of iodine.

Six samples in which no hydriodic acid was found contained from 6.2–7.9 per cent. of iodine, only two approaching the official standard closely.

*Tinctura Opii.*

Prepared strictly according to the United States Pharmacopœia, it should have a specific gravity of 1.0075–1.0295, yield from 4.5–6.7 per cent of solid residue upon evaporation, and contain about 1.4 per cent. of morphine and 49.75 per cent. by volume of absolute alcohol.

An examination of five samples gave the following results, showing that the preparations were below standard in opium strength.

	Spec. Grav.	Residue.	Morphine.	Alcohol.
1.....	0.967	2.7 per cent.	0.65 per cent.	—
2.....	0.939	4.5 per cent.	1.00 per cent.	62 per cent.
3.....	0.950	4.9 per cent.	0.80 per cent.	—
4.....	0.947	3.5 per cent.	0.52 per cent.	—
5.....	1.007	4.2 per cent.	1.25 per cent.	50.25 per cent.

*Tinctura Opii Camphorata.*

If made strictly according to the U. S. Pharmacopœia it should have a specific gravity of 0.95969–0.96032 and contain 0.052–0.060 per cent. of morphine, 38.25 per cent. of absolute alcohol, and 5 per cent. of glycerin, all by weight.

A series of five examinations gave the following results :

	Spec. Grav.	Morphine.	Alcohol.	Glycerin.
1 .....	0.959	0.058 per cent.	37.6 per cent.	4.8 per cent.
2 .....	0.989	0.058 per cent.	39.0 per cent.	9.5 per cent.
3 .....	0.901	0.034 per cent.	40.0 per cent.	4.5 per cent.
4 .....	0.9804	0.026 per cent.	34.0 per cent.	6.2 per cent.
5 .....	0.9492	0.026 per cent.	45.0 per cent.	2.1 per cent.

*Conclusions.*—Nos. 1 and 2 were practically of standard strength, with the exception of an excess of glycerin in the latter. Nos. 3, 4 and 5 were carelessly made and decidedly below the standard in morphine strength.

*Vinum Ferri Amarum.*

Official Bitter Wine of Iron should contain at least 0.575 per cent. of quinine alkaloid, and about 18.21 per cent. by weight of absolute alcohol, the latter depending upon the quality of wine used.

Five samples examined contained 0.26 per cent., 0.34 per cent., 0.40 per cent., 0.44 per cent. and 0.56 per cent. of alkaloid respectively, the amount of alcohol found varying from 13.26 to 19.5 per cent.

In every community, as well as in all walks of life, we find three general classes, characterized as good, bad and indifferent. Pharmacy is no exception to this rule, and we must, therefore, expect to find some that are ignorant, weak and incompetent; some that are educated, strong and competent, and finally, some who are so engrossed in the contemplation of their own self that they fail to do justice to their own calling. The men who foster the influences which tend to the social, moral and educational advancement of the masses are arrayed against those who foster the influences begotten by ignorance strongly entrenched behind the barriers of prejudice and indifference. The professional calling of Pharmacy requires intellect as well as education. Intellect and the development of intellect are essential to the maintenance of the integrity of the Pharmacopœia. Education must be the key note, and the interpretation of the Pharmacopœia is assured. The data furnished by the preceding analyses clearly outline the forces which influence the lack of uniformity in pharmacopœial preparations, inability to interpret the pharmacopœial requirements and the lack of that spirit which enhances the growth and prosperity of pharmacy. Truth may be slow, but it is mighty and will prevail.

The next paper was read by Dr. Jelliffe :



## NOTES UPON STROPHANTUS HISPIDUS AND STROPHANTHUS KOMBÉ.

BY SMITH E. JELLIFE, M. D.

In the Druggist's Circular of May 16, 1896, there was published a preliminary report of some observations upon the strophanthus seeds found in the American market, where it was stated that at least six different kinds of seeds had been found, four in abundance, the others rarely. These four were *Strophanthus hispidus*, *S. Kombé*, *S. asper* and *S. gratus*.

It was noticed that *Strophanthus Kombé* was considered by many botanical systematists as identical with *Strophanthus hispidus*, and in the report the two seeds were described as one, with the note that there were some distinctions worth recognizing.

It is the purpose of this communication to report more fully upon the examination of the two seeds from the anatomical point of view.

In the large number of seeds sent to the writer from the different houses there was ample opportunity to compare them. At first sight there appeared but little difficulty in distinguishing any one seed from another, but when the samples were spread out and carefully sorted according to size, shape and color, it was seen that there was a steady gradation from a short, half inch, dark-brown "*hispidus*" seed to a long, one inch, light green "*Kombé*" seed.

An anatomical study of the series upon chosen representatives along the line, showed much the same gradation, although here perhaps there was a clue to the identification, but it proved to be one which should be read on the broadest lines only.

Taking the extremes and the means, it was found possible to artificially separate the seeds into three fairly well marked classes, as follows:

*First Class.*

In this are placed the shorter, brown, and smoother seeds; they average about one-half inch in length, and are dark reddish brown in color, swollen at the base, and sparingly provided with hairs which were most prominent upon the raphè. Anatomically the seed is characterized by the short stubby hairs which are few in number. The basal portions of the hairs have inflated side walls which, in the majority of the seeds examined, are almost as broad as long, and resemble those of *Strophanthus gratus*. The layer of much flattened and contorted cells lying beneath the epidermis is from 5 to 7 cells deep. The polygonal cells beneath this are from 5 to 8 cells deep. The layer lining the cotyledons is similar to that just beneath the epidermis, and consists of from 2 to 3 rows of much flattened and elongated cells.

*Second Class.*

The seeds in this class are longer, at least three quarters of an inch. They are flatter and more twisted and slender in their general habit. They vary from brown, through a yellow brown to buff, and are more plenti-

fully provided with hairs than those of the preceding class, these hairs being collected into ridges.

Anatomically considered, the increased number and length of the hairs is worthy of notice. The basal side walls of the hair are as a rule more uniformly thickened and the layer of thin flattened cells beneath is somewhat deeper, consisting of from 7 to 10 layers. The layer of polygonal cells is about the same, and the layer of the cells about the cotyledons is more open, and is deeper, having from 5 to 6 rows of cells.

### *Third Class.*

In this class are placed the larger seeds, those varying from  $\frac{3}{4}$  to 1 inch in length; they range from brown to light brown to greenish. In their general outline they are pointed and more oblong and flatter than those of the preceding classes. They are densely covered with short hairs which are markedly conspicuous on the ridges.

Anatomically considered, the seeds of this class are characterized by the large number of their hairs and their greater length. The thickened side walls of the epidermal cells are elongated. The flattened cells beneath the epidermis are from 5 to 8 cells deep; and the polygonal cells 5 to 10 cells deep, while the innermost layer consists of 3 to 5 rows of cells.

It can, therefore, be seen that there are a few characters which, while not enough to maintain specific differences in the seeds, are, however, of some importance in their identification. The changes found in the basal side walls of the epidermis are of the most value in determination of powdered examples, but as this character seems to be associated with the elongated or shortened habit of the seed, it is not to be relied upon too implicitly.

A paper on Antitoxin by H. K. Mulford was presented by Dr. Whelpley, who moved that Mr. Mulford, although not yet a member, be granted the privilege of the floor for the reading of his paper. The motion was seconded and carried. The following paper was then read by the author:

### THE PREPARATION OF DIPHTHERIA ANTITOXIC SERUM.

BY H. K. MULFORD.

While the preparation of diphtheria antitoxin is one that concerns the bacteriologist only, the subject is one that is of deep interest to the pharmacist.

The discovery of diphtheria antitoxin was made by Behring, as a result of his primary and original investigation in connection with Kitasato upon tetanus antitoxin.

The method of preparation first proposed was the injection into suitable animals of cultures of the diphtheria bacilli, in which the bacilli had been killed by heat. When the animal could stand these and manifest only a slight irritation or œdema at the point of injection or by showing only feeble temperature re-action, highly attenuated living cultures were intro-

duced in increasing amounts, a sufficient immunization or resistance being given by the primary injections to prevent fatal termination. The injections of living cultures, however, are greatly to be discouraged, since such injections, and those of attenuated cultures containing dead bacilli, are accompanied by great destruction of the cellular tissues of the animal which is to furnish the antitoxin, its physical strength being greatly lessened by such destructive processes.

The best method is as follows: As virulent a culture of the *bacillus diphtheriæ* is obtained as possible, it is grown upon Loeffler's solidified blood serum mixture consisting of:

Blood serum.....	3 parts.
1 per cent. glucose bouillon.....	1 part.

and placed in an incubator at a temperature of 45 degrees Centigrade.

After a period of 24 hours the cultures are developed. From this a single colony of the bacilli is transferred into small flasks of a 2 per cent. peptone bouillon rendered decidedly alkaline to litmus. These small flasks are placed in an incubator which is kept in a constant temperature of 37 degrees C. for 24 to 48 hours, and afterwards the contents are transferred with a pipette into rounded flat flasks of a capacity of 500 Cc. These large flasks are placed in an incubator and kept at a constant temperature of 37° C. until the bacilli have become very numerous and have secreted enormous amounts of active and powerful toxin in the bouillon.

When this has taken place a microscopic examination is made, to see that no foreign bacilli are present, and the diphtheria toxin contaminated. If uncontaminated, one per cent. of trikresol is added to prevent contamination, and to destroy the bacillus diphtheriæ. The bouillon, or as we now term it, Diphtheria Toxin, is filtered through a modified Chamberland filter, to separate it from the dead bodies of the diphtheria bacilli. No bacilli are therefore injected into the animals to be immunized, and they are not given "diphtheria," but the toxin secreted by the bacilli.

The toxicity of the toxin is determined by its injection into guinea pigs, and to be of a desired strength, 0.01-0.1 Cc. should produce death of the control animal in from 24 to 36 hours.

For the preparation of Diphtheria Antitoxin any animal may be selected, but horses are preferred, inasmuch as they are more easily operated upon, and because they furnish excellent serum in liberal quantities. Our experience, as to the type of horse selected, particularly in the earlier observations, has been valuable, being of unusually good quality, a number showing trace of fine breeding; such horses, however, are not suited for immunization; the finely bred horse being sensitive, frets at his inactivity (for no work is performed by the animal while being immunized, only a sufficient amount of exercise being given to maintain good health) neither does he take kindly to the injection of the toxin, or the subsequent bleed-

ing operations. The preference is given to large, compactly built animals of dark color, 16 to 18 hands high, from 1400 to 1600 lbs. weight, of quiet disposition and in good health.

Before injecting with toxin, the mallein test for glanders, and the tuberculin test for tuberculosis is applied, the results of such being clearly shown in the temperature, which is carefully recorded. Animals responding to either of these tests must be discarded.

The primary injection of the toxin is 1 Cc., and in equal periods of from six to eight days, constantly increasing amounts of the toxin are administered, until in about ten weeks to three months, as great quantities as 300 Cc. of this powerful toxin may be borne with tolerance. When the injection of these larger amounts is accomplished with but little elevation of temperature, and but a slight œdema is manifested at site of injection, a trial bleeding of 20 Cc. of blood is made, the blood always being taken from the jugular vein. If the tests for antitoxic value, as described later under the testing of antitoxin, are favorable, the horse is bled a large quantity, the blood being collected in sterile bottles, and placed in a refrigerating room for sufficient time (about 24 hours) until the coagulation allows the clear serum, which contains the antitoxin, to separate. This serum is drawn off by pipettes and preserved by the addition of 0.5 per cent. trikresol.

The most important step now awaits the operator, the determination of the exact strength possessed by the antitoxin, as expressed in immunizing units.

For this purpose the minimum fatal dose of a strong toxin is accurately determined by the injection of various amounts into a number of guinea pigs; the smallest amount of toxin that invariably causes death of the animal in a reasonable time, being regarded as the minimum fatal dose. It is usually calculated, so much per 100 grams body weight.

Having found the minimum fatal dose of the toxin used to be .005 per 100 gramme guinea pig, the control animals are given ten times this absolutely fatal dose of diphtheria toxin, per 100 grammes weight, and if testing for 100 units per Cc.,  $\frac{1}{1000}$  Cc., antitoxin obtained from a horse is given. If testing for 250 units per Cc.,  $\frac{1}{8000}$  Cc. of antitoxin would be given; if for 500 units,  $\frac{1}{8000}$  Cc. of antitoxin would be administered.

While this paper does not deal with the therapeutic value of diphtheria antitoxin, the absolute scientific value and correctness of these tests may be appreciated by these observations, and we prove the application of the antitoxin by its neutralizing or protective value upon the animals receiving ten times the absolutely fatal amount of toxin. Unfortunately we cannot arrive at the exact dose for therapeutic application by this method, since the human subject is much more susceptible to the poison than the guinea pig, and we have no possible means of determining the amount of toxin secreted by the diphtheria bacilli in the patient suffering with diphtheria;

therefore, if any error in the amount of antitoxin administered is made, it should be its administration in excessive rather than in insufficient quantity.

Appreciating, however, that the effect of diphtheria antitoxin is only in neutralizing the toxins of diphtheria, we know how necessary it is to make application of this "healing serum" before the nerve centres become paralyzed, the heart and kidneys become diseased and the entire system invaded by the absorption of the fatal toxin.

Diphtheria antitoxin is a most delicate substance, and its preparation can only be safely carried on in thoroughly-equipped institutions, where men of undoubted integrity and ability are in supervision.

While antitoxin is a delicate substance, yet when a proper preservative in a sufficient amount is used and it is hermetically sealed in sterile vials it will preserve its strength and antitoxic value for at least six months; indeed, repeated experiments prove that it retains its activity for a much longer period.

Chloroform, camphor, sodium salicylate, carbolic acid and formaldehyde have been employed, but the preference is greatly in favor of trikresol and formaldehyde. Camphor seems to be particularly dangerous, since it possesses but a feeble preservative action, and its strong odor will prevent the detection of putrefaction processes, should they be established. Chloroform and sodium salicylate are unsuited, on account of their active therapeutic effect. Trikresol in a strength of but 0.5 per cent. protects the serum absolutely; in fact, no bacteria can develop with this percentage of trikresol. It is not a poison, as is carbolic acid, nor is it an irritant to the urethral tract. Its chief disadvantage is that it produces a fluorescent appearance to the serum, but the absence of cloudiness is shown by permitting the light to enter squarely through the vials containing the finished product.

Antitoxin is usually supplied in bottles containing varying quantities of serum, but of a certain number of immunizing units. This is apt to lead to confusion, and we would strongly recommend that a fixed standard of a definite number of immunizing units be secured in each Cc. of serum. While this involves extra labor, it prevents confusion on the part of the physician, and the end is well worthy of the increased labor. If serum is produced of a strength of 125 units per Cc., it may be mixed with an equal amount of serum containing 75 units per Cc. the result being that each Cc. of the mixture will contain 100 immunizing units, and if it is desired that 500 units are to be administered, 5 Cc. will be understood as the amount to be injected, etc.

It is a matter of gratifying interest to Americans, that serums of the highest antitoxin values have been prepared in our own country. Serums are now produced in which each Cc. contains as much as 800 units, and we confidently believe as great an amount of antitoxic units as 1000 to the Cc., will be produced in the near future. This overcomes the chief ob-

jection that has been urged against serum, even by its warmest advocates—more prompt absorption will take place, ensuring quicker results; besides the attendant dread caused by the large instruments necessary for the introduction of larger amounts of weaker serums will be avoided: 2000 units may thus be administered in an ordinary hypodermatic syringe.

Dried serums are much less active than fluid or fresh ones. They are prepared by the addition of aluminum or ammonium sulphate, with subsequent precipitations of the Antitoxin by a one per cent. soda solution. or by inspissation. They have given fairly good results, but cause greater irritation than do fluid serums, and not being freely soluble, cause annoyance in administration, and give greater opportunities for contamination in their preparation and in the dilution for administration.

We do not know what action takes place in the serum of the horse producing the antitoxin, nor do we know positively its action upon the organism of the test animal, or the patient treated for diphtheria. The fact that the test animals always recover under antitoxin, while they always die with but one-tenth the amount of toxin (without antitoxin), and the reduction in the mortality of patients ill with diphtheria are, however, so convincing that no one can reasonably doubt its efficiency. No reason can exist for its non-employment on the ground that we do not know the nature of the changes, for who knows the action of arsenic in anæmia, mercury in syphilis, and many other of our therapeutic agents? They are used empirically because favorable results are secured.

The accepted theory of the action of antitoxin is that it renders the living cells of the organism tolerant to the toxin liberated by the diphtheria bacilli, and by increasing this tolerance they are able to overcome these toxins.

That antitoxin exerts no chemic action on the toxin can be proved by mixing toxin and antitoxin, maintaining the mixture at a temperature of 70° C. At this temperature the antitoxin is destroyed, while the toxin remains but slightly disturbed in virulence.

Ewing & Billings have made numerous experiments as to the action of antitoxic serum upon the blood and agree that:

“In cases of diphtheria treated with antitoxin the diminution in the number of red corpuscles is much less marked than in those cases treated without it. The leucocytes are apparently unaffected in number by the antitoxin, the hæmoglobin is also much less affected in the cases treated with antitoxin, thus confirming the statement as to the red corpuscles: while the leucocytes are stimulated in action, as evinced by their taking a more vivid stain when subjected to indigo solution.

*Philadelphia, July, 1896.*

Mr. Hereth exhibited a specimen of “*Flora China*” a substance understood to be sold as a substitute for quinine sulphate. He had found that

the substance was insoluble in sulphuric acid and not affected in the Bunsen flame ; from its reactions it was supposed to be calcium sulphate.

The following papers were read by title, the authors being absent, and upon motion were referred to the Committee on Publication. (The text of these papers will appear further on).

Salol in Salicylic Acid. By Frederick Hoffman.

A Method for the Determination of Phosphoric Acid in Soluble Ferric Phosphate, U. S. P. By W. A. Puckner and Frank Julian.

On the Chemical Composition of the Oil from *Monarda Punctata*. By William R. Schumann and Edw. Kremers.

On the Chemical Composition of the Oil of *Monarda Fistulosa*. By E. J. Melzner and Edw. Kremers.

What is the Nature of the Modern Dietetics used in Medicine and Pharmacy? By F. E. Stewart, M. D.

On Antitoxin. By C. T. McClintock, M. D.

Pepsin Test, An Answer to Query 20. By C. C. Sherrard and J. L. Tegarden.

United States Pharmacopœia Pepsin Standard Compared with Foreign Pharmacopœial Standards. By C. C. Sherrard.

The installation of officers was then proceeded with, and Mr. W. C. Alpers having been introduced to the meeting as Chairman of the Section for the ensuing year, expressed thanks for the honor conferred, and asked the assistance of the members towards a successful meeting in 1897. The Secretary-elect, being absent, could not be installed.

Upon motion of Dr. Whelpley, a vote of thanks was tendered to the retiring officers.

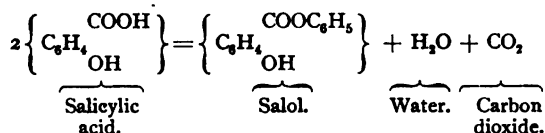
The Minutes of the session were read, and on motion of Mr. Main approved as read, whereupon the Section adjourned to meet again in August, 1897.

#### SALOL IN SALICYLIC ACID.

BY FRED. HOFFMANN.

Among the queries proposed by the Committee on Scientific Papers for the present annual meeting of the American Pharmaceutical Association is one in regard to the occasional presence of salol in commercial synthetic salicylic acid. In order to account for this fact it is not necessary to enter upon any consideration of the various methods of preparation, or the properties and reactions of salicylic acid, but simply to call to mind the fact that this acid when exposed to heat, suffers, at about 160° to 240° C., a decomposition, partly into phenol and carbon dioxide, and partly into anhydrides, which by a partial re-combination with the phenol form salol. One of the various patented methods of manufacture of salol is based upon this process.

The direct transformation of salicylic acid into salol by heat may be indicated by the following equation :



As is well known, or may readily be ascertained from any work on pharmaceutical chemistry, the various older methods of manufacture of synthetic salicylic acid involve for the final isolation and purification of the acid processes of precipitation and subsequent re-crystallization from solutions of the acid, whereby impurities and by products, including traces of phenol and salol, are entirely removed. While the original patentees and manufacturers of synthetic salicylic acid continue in their approved methods of purification, some other manufacturers more recently seem to employ processes of distillation or of sublimation for the purification of their product. In this case the above equation accounts for the fact that such brands of salicylic acid may contain traces of salol. But as salol has a slight but distinct aromatic odor, while pure salicylic acid is entirely odorless, no manufacturer will bring a product into the drug market which contains so much salol as to *prima facie* indicate such contamination by the odor of salol; if such odor occasionally is met with in salicylic acid, it can only be due to insignificant traces, which from a therapeutical point of view are of no consequence, since both substances have a similar action and use.

In order to ascertain the presence of salol in salicylic acid, a sample is dissolved in a dilute aqueous solution of sodium or ammonium carbonate without applying heat. Pure salicylic acid yields a clear solution, while salol, being insoluble, causes turbidity. Being readily soluble in ether, the salol is extracted from the turbid salicylic acid solution by shaking it with a little ether. The ethereal solution is then separated and shaken with about half its volume of distilled water in order to remove traces of salicylic acid. The ethereal solution is separated and evaporated on a water glass at a gentle heat. The residue is dissolved in a few drops of alcohol and left standing for crystallization. The dry residue or crystals are identified as salol by its characteristic low melting point at 42 to 43° C., while salicylic acid melts at about 157° C.

In view of such absurd statements occasionally met with in American trade papers that "salicylic acid made from phenol," unless carefully purified, contains highly toxic bi-products, while that made from oil of wintergreen is pure," and similar ones, well-informed practitioners of medicine and pharmacy need not be reminded of the fact that any objectionable impure salicylic acid, unless artfully adulterated, is excluded from the drug market not only by the pharmacopœial requirements, but, as far as a contamination with salol is concerned, by the very nature and character-



istic of this phenyl salicylate. Moreover, as stated before, the presence of salol can only amount to traces, insignificant in the medicinal, industrial and domestic application of salicylic acid.

A METHOD FOR THE DETERMINATION OF PHOSPHORIC ACID IN  
SOLUBLE FERRIC PHOSPHATE U. S. P.

BY W. A. PUCKNER AND FRANK JULIAN.

Having occasion to examine a number of samples of phosphate of iron, it was found that while methods for the determination of the iron in this salt have been repeatedly and closely studied, nothing seems to have been written bearing on the determination of the second and equally important constituent of this preparation.

The determination of the phosphoric acid is here complicated by the presence of iron and citric acid, both of which must be removed before its estimation is practicable. Of these several methods for the determination of  $P_2O_5$  in the presence of Fe, that known as the Molybdate-Magnesia Method \* has been almost universally adopted, and is so well known that it need not be further described here. But while this method is acknowledged to be superior to all others, it is a troublesome operation, and yields at best but approximate results.

While it is beyond the scope of this paper to consider all proposed changes, the writers deem it necessary to briefly outline some of them before offering their own experiments. Of the changes proposed, we may first note those having in view a shortening in time of the digestion of the molybdate mixture, which is attained by employing a temperature of  $60^{\circ}$ – $80^{\circ}$  C., instead of  $40^{\circ}$  C., as in the original method,† or a decrease in the volume of molybdate solution necessary by an addition of ammonium nitrate.‡ S. W. Johnson,§ however, shows that these are inadmissible where iron is present in considerable quantity. The remaining proposed changes all deal with the conditions under which the ammonium-magnesium phosphate is precipitated. According to O. Abesser, W. Jani and M. Maerker,|| the ammoniacal solution of the yellow precipitate is approximately neutralized with hydrochloric acid, precipitated with magnesia mixture, and lastly a definite quantity of ammonia water added. Peitsch,

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\* Sonnenschein, J. f. Prakt. Chem., 53-343.  
Fres. Quan. Anal. 6th Edit., pp. 404 and 692.

† Wagner, Ztschr. Anal. Chem., 19-444.

‡ Koenig, Ztschr. Anal. Chem., 10-305.

Wagner, Ztschr. Anal. Chem., 21-289.

Gilbert, Correspondenzblatt d. V. Anal. Chem. Nov. '78.

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Rohn and Wagner\* dissolve the molybdate precipitate in ammonia water, and then add the magnesia mixture directly to it.

Neubauer † has studied these methods, and claims that, depending on the condition of the solution and the manner of precipitation, the magnesia precipitate may be obtained in three different conditions, thus :

I. If the precipitate forms in a neutral or ammoniacal solution which contains no excess of magnesia, then the presence of ammonium salts causes the formation of a precipitate which contains less than the theoretical amount of magnesia. On ignition, a loss of  $P_2O_5$  occurs, and the results are too low.

II. If the precipitate forms in the presence of an excess of magnesia mixture, with however no excess of ammonia, the precipitate is of normal composition, and the results are correct.

III. If the precipitate forms in a solution containing an excess of both Mg and  $NH_3$ , the precipitate will contain an excess of Mg, and the results are too high. This explains the low results obtained by the Peitsch-Wagner method where magnesium chloride is gradually added to the ammonical phosphate solution. Owing to the gradual addition of the magnesia mixture, nearly the entire phosphoric acid is thrown down ere an excess of magnesia is present, the precipitate is deficient in Mg, and on ignition loses a part of its phosphoric acid.

In the method of Abesser, Jani and Mærker, where the precipitation is made in a nearly neutral solution, the precipitate usually is a mixture of II. and III., or when the magnesia mixture is added very gradually a mixture of I., II, and III., and in the latter instance the two errors may compensate each other to a certain extent.

Neubauer concluded that it is impossible to obtain a normal magnesium-ammonium phosphate when using the molybdate method ; he adopted the manipulation of Wagner, and has constructed a table of corrections for loss of  $P_2O_5$  on ignition.

The following experiments were undertaken with a view of verifying the results of Neubauer: The solutions used were :

Sodium Phosphate Solution : The sodium phosphate, Koenig's C. P., was recrystallized and found to contain 60.23 per cent. of water of crystallization (theory 60.31 per cent.). A solution was prepared containing in 25 Cc. 1.2112 Gm.  $Na_2HPO_4 \cdot 12 H_2O$ , which should contain 0.2402 Gm.  $P_2O_5$ .

Molybdate Solution : Ammonium molybdate test solution, U. S. P. Dilute

Molybdate Solution : Molybdate solution ; water, equal volumes.

Magnesia Mixture : Magnesium chloride, cryst., 55 Gm., ammonium chloride, 70 Gm. ; dissolve in  $2\frac{1}{2}$  per cent. ammonia water, enough to make 1000 Cc.

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\* Ztschr. Anal. Chem., 19-444.

† Inaugural Dissertation, Rostock, 1893.

Ztschr. Anal. Chem., 33-363.

J. Am. Chem. Soc., 16-289.

To verify the strength of the phosphate solution, portions of 25 Cc. were precipitated directly with magnesia mixture; *i. e.*, 25 Cc. phosphate solution were mixed with water, 50 Cc.; and 25 Cc. magnesia mixture added at the rate of 50–100 drops per minute with constant stirring and allowed to stand over night, 8 to 15 hours. The precipitate was then transferred to a tared Gooch crucible, washed with 2½ per cent.  $\text{NH}_3$ , dried thoroughly at 100° to 120° C., and finally heated to full redness for 15 minutes. The results were:

Found, $\text{Mg}_3\text{P}_2\text{O}_7$ :	equal to	$\text{P}_2\text{O}_5$	
0.3766 Gm.		0.2402 Gm.	
0.3761 Gm.		0.2400 Gm.	Theory: $\text{P}_2\text{O}_5$ 0.2402 Gm.

Portions of 25 Cc. of the phosphate solution were now digested with 25 Cc. molybdate solution at 40° C. for four hours. The supernatant liquid was filtered off and the precipitate and filter washed with dilute molybdate solution. The yellow precipitate was treated with 10 per cent. solution of ammonia just sufficient for complete solution, 10 Cc. being required, the liquid filtered, beaker and filter washed with 35 Cc. water, and the solution precipitated with 25 Cc. magnesia mixture as before, and finally a further quantity of 15 Cc. of 10 per cent.  $\text{NH}_3$  added. Three determinations yielded:

Found, $\text{Mg}_3\text{P}_2\text{O}_7$	equal to	$\text{P}_2\text{O}_5$	per cent. of theoretical.
0.3903 Gm.		0.2489 Gm.	103.62 per cent.
0.3948 Gm.		0.2516 Gm.	104.78 per cent.
0.3936 Gm.		0.2509 Gm.	104.45 per cent.

A series of experiments exactly like the preceding ones, except that the yellow precipitate was dissolved in 15 Cc. ammonia water, yielded:

Found, $\text{Mg}_3\text{P}_2\text{O}_7$	equal to	$\text{P}_2\text{O}_5$	per cent. of theoretical.
0.3804		0.2425	100.95 per cent.
0.3836		0.2446	101.83 per cent.
0.3825		0.2439	101.54 per cent.

These results are in entire accord with those of Neubauer. In the series where 10 Cc. ammonia water was used the solution contained so little free ammonia that almost the entire volume of magnesia mixture could be added before separation of the magnesia precipitate took place; the precipitate formed therefore under condition III., and the results were high. When 15 Cc. ammonia solution were used, conditions II. and III. prevailed, and the results still remained excessive. In the next series we employed Wagner's method as used by Neubauer, *i. e.*, the details were identical with those described up to the point of the solution of the yellow precipitate, which was dissolved in 100 Cc., 2½ per cent.  $\text{NH}_3$ , and to this 25 Cc.  $\text{Mg}$  mixture slowly added. The results were:

Found, $\text{Mg}_3\text{P}_2\text{O}_7$	equal to	$\text{P}_2\text{O}_5$	per cent. of theoretical.
0.3759 Gm.		0.2397 Gm.	99.79 per cent.
0.3758 Gm.		0.2396 Gm.	99.75 per cent.
0.3780 Gm.		0.2410 Gm.	100.30 per cent.
0.3775 Gm.		0.2407 Gm.	100.21 per cent.
0.3758 Gm.		0.2396 Gm.	99.75 per cent.
0.3763 Gm.		0.2400 Gm.	99.89 per cent.

These come much nearer to theory, the highest being 0.3 per cent. in excess, while the lowest is 0.25 per cent. below; the maximum variation being 0.55 per cent., with a general average of 99.95 per cent.

The above does not accord with the conclusions of Neubauer, who applies a correction, for loss of  $\text{P}_2\text{O}_5$  on ignition of 0.0105 Gm. for every 0.340 Gm.  $\text{Mg}_3\text{P}_2\text{O}_7$  weighed. On this basis 0.3766 Gm., the average weight obtained in our determinations, would be increased to 0.3883 Gm., equaling  $\text{P}_2\text{O}_5$  0.2476 Gm., or 103 per cent., and it was therefore decided to adopt the Wagner method without the use of Neubauer's correction.

Before, however, the method can be applied to the preparation in hand, the citric acid must be destroyed. B. B. Ross\* recommends heating with strong sulphuric acid and mercuric oxide as in the Kjeldahl nitrogen method; but this scheme is unsuitable, as the precipitation of ammonium-molybdenum phosphate is incomplete in the presence of a considerable proportion of sulphuric acid, nor can this be counteracted by ammonium nitrate, since such addition is inadmissible in the presence of iron, as before stated.

In the "Methods of Analysis," adopted by the Association of Official Agricultural Chemists (1895), it is recommended, in analysis of phosphate fertilizers containing much iron or alumina, to destroy organic matter by boiling with nitro-hydrochloric acid, and this was adopted, after trying various other suggestions, as the least objectionable. To test the method iron citrate was added to the phosphate solution, and mixed with 10 Cc. of nitric and 3 Cc. of hydrochloric acid, and the whole boiled in a Kjeldahl digestion flask, until reduced to about 5 Cc., washed into a beaker with 25 Cc. of water, and treated with molybdate, etc., as before. In the following table the ratio of the phosphoric acid to iron and citric acid was varied, while the volume of molybdate solution, magnesium mixture, etc., was the same.

Iron citr.	Soda phosph.	equal to $\text{P}_2\text{O}_5$
0.5 Gm.	1.2109 Gm.	0.2402 Gm.
1.0 Gm.	1.2109 Gm.	0.2402 Gm.
1.5 Gm.	1.2109 Gm.	0.2402 Gm.
2.0 Gm.	1.2109 Gm.	0.2402 Gm.
1.0 Gm.	1.0016 Gm.	0.1986 Gm.
1.0 Gm.	0.7162 Gm.	0.1420 Gm.

\* J. Am. Chem. Soc., 16, 304.

Found, $Mg_2P_2O_7$	equal to	$P_2O_5$	per cent. of theoretical.
0.3740 Gm.		0.2385 Gm.	99.22 per cent.
0.3799 Gm.		0.2384 Gm.	99.25 per cent.
0.3739 Gm.		0.2384 Gm.	99.25 per cent.
0.3735 Gm.		0.2381 Gm.	99.12 per cent.
0.3081 Gm.		0.1965 Gm.	99.00 per cent.
0.2217 Gm.		0.1412 Gm.	99.40 per cent.

The results fall short of a high degree of accuracy, yet for purposes of examination for constancy in composition of ferric phosphate are entirely satisfactory, and we would recommend the method given in full detail below.

Weigh 1.5 Gm. iron phosphate, introduce into a Kjeldahl digestion flask, dissolve in 25 Cc. water, add 10 Cc. conc. nitric acid, and 3 Cc. strong hydrochloric acid, and boil until reduced to 5-10 Cc.; transfer to a beaker, washing the flask with about 25 Cc. water, and add 250 Cc. molybdate solution, and digest at 40° C. for four hours. Decant the clear liquid through a small filter, and wash the precipitate, retaining as much as possible in the beaker, with several small portions of dilute molybdate solution, until the filtrate remains clear, after making alkaline with ammonia. and therefore is free from iron; three portions of 15 Cc. are usually sufficient. The phosphomolybdate of ammonia is now to be dissolved in 25 Cc. 10 per ammonia water. This is best accomplished by pouring the ammonia water on the filter containing a portion of the yellow precipitate, and allowing it to run into the beaker containing the bulk of it; when solution has taken place, it is filtered, through the same filter, into a beaker, and the first beaker and filter washed with 75 Cc. of water. Now 25 Cc. magnesia mixture are added, at the rate of 50-100 drops per minute and with constant stirring. After standing eight hours or over night the precipitate is transferred to a Gooch filter, using portions of the filtrate for the purpose, and finally the precipitate is washed with 2½ per cent. ammonia, until free from chlorides (25 Cc. are usually sufficient). The precipitate is dried thoroughly at 100-120° C., then gradually heated to bright redness, and retained at this temperature for 15 minutes, cooled and weighed.

#### ON THE CHEMICAL COMPOSITION OF THE OIL FROM *MONARDA PUNCTATA*, L.

BY WILLIAM R. SCHUMANN AND EDWARD KREMERS.

In a paper on the chemical composition of the volatile oil from *Monarda fistulosa*,<sup>1</sup> one of us calls attention to the fact that although examinations of four specimens of *Monarda punctata* have been recorded, none of these specimens are authentic.

In 1846 an oil of horsemint supposed to be derived from *Monarda punctata* was examined by Arppe.<sup>2</sup>

In 1888 an examination of oils supposed to be obtained from *Monarda*

*punctata* was made by Mr. Schroeter.<sup>8</sup> One sample of oil was taken from the cabinet of the Philadelphia College of Pharmacy, where it had been standing for six years, during which time it had deposited crystals of thymol. The other two specimens were evidently obtained in the open market, from reliable sources.

However, for none of the four specimens of oil heretofore examined is there any positive guarantee given as to their source. Arppe separated mechanically a crystalline stearopten, evidently thymol, which had been deposited upon standing. Schroeter states that the oil contains a hydrocarbon of the formula  $C_{10}H_{16}$ ; thymol "which is dextrogyrate;" a compound  $C_{10}H_{18}O$ , boiling between  $240^{\circ}$ – $250^{\circ}$ ; and formic, acetic and butyric acids.

The oils used, the methods employed, as well as the description of some of the results, e. g., the rotatory power of the optically inactive thymol, did not inspire confidence.

Some of these odd statements have crept into the literature of volatile oils. Thus Bornemann<sup>9</sup> calls attention to the supposed difference in rotatory power between thymol from oil of thyme, and that from *Monarda*. He also mentions that the thymol from fresh monarda oil is non-crystallizable, whereas the crystallizability of the thymol increases with the age of the oil.

#### EXPERIMENTAL PART.

In view of the interesting results obtained upon examination of the oil from *Monarda fistulosa* obtained from authentic material, and some of the discrepancies that have crept into literature on the subject, another examination seemed called for.

The material from which the oil was obtained was collected early in August, near Pine Bluff, about fifteen miles west of Madison, and was identified by Prof. L. S. Cheney of the University of Wisconsin.

The flowering herb was distilled with water vapor while still fresh, about one-half of a pound of oil being obtained. The oil is of an amber or light yellowish color, with a pleasant yet characteristic mint-like odor, specific gravity 0.9307 at  $20^{\circ}$ . It turns the plane of polarization  $+0.05479$  to the right at  $20^{\circ}$ , hence  $[\alpha]_D = +0.0588$ .

#### SEPARATION OF PHENOL.

In order to remove the phenol, the oil was shaken with 10 per cent. caustic soda solution.

1. From 25 Cc. of oil shaken with 50 Cc. of the solution, 14 Cc. went into solution, or 56 per cent. phenol.

2. A duplicate experiment gave identical results.

3. From 150 Cc. of oil shaken with 350 Cc. of soda solution, 84 Cc. went into solution, or 56 per cent.

The alkaline solution of phenol was distilled with water vapor to remove

any non-phenol portion of the oil that might have gone into solution. The solution was then acidulated with sulphuric acid, and the distillation continued. The distilled oily phenol was dried with exsiccated sodium sulphate and exposed to the temperature of a winter's night, when it solidified to a crystalline mass. The melting point of the dried, almost colorless crystals was found to be  $50^{\circ}$ . With chloroform and caustic soda, they gave the characteristic reactions of thymol and carvacrol. The melting point, however, excludes the latter.

#### NON-PHENOL CONSTITUENTS.

That portion of the oil which was not dissolved by shaking with 10 per cent. soda solution was distilled with water vapor. 79.3 grams of oily distillate were obtained. This was dried. Inasmuch as the original oil had been shaken only once with caustic soda, the oily distillate still gave a reaction for thymol when tested, according to Flückiger,<sup>6</sup> with chloroform and caustic soda. This reaction, however, is very delicate, and would indicate traces of phenol.

The oil deprived practically of thymol had a specific gravity of 0.887. In a 100 Mm. tube, it turned the plane of polarized light  $1.7166^{\circ}$  to the right. Upon fractionation the following fractions were obtained :

$78^{\circ} - 88^{\circ}$	3.5 Cc.	$178^{\circ} - 186^{\circ}$	0.5 Cc.
$88^{\circ} - 98^{\circ}$	1.75 Cc.	$186^{\circ} - 202^{\circ}$	6.0 Cc.
$98^{\circ} - 166^{\circ}$	about 7.0 Cc.	$202^{\circ} +$	
$166^{\circ} - 172^{\circ}$	4.0 Cc.		
$172^{\circ} - 178^{\circ}$	13.0 Cc.		

#### FRACTION $172^{\circ} - 178^{\circ}$ .

It was shown by Mr. Brennan a year ago that the oil of *Monarda fistulosa* contained cymene. The large yield of this fraction suggested the possibility of the presence of this hydro-carbon in this closely related oil. In order to ascertain its presence or absence, 7 Cc. of this fraction were heated with a dilute solution of 30 gm. of potassium permanganate until the color disappeared. The solution was then filtered and evaporated to dryness, the residue then dissolved in water and acidulated with sulphuric acid. A dense whitish precipitate was formed. After recrystallization from alcohol the melting point was found to be  $155^{\circ} - 156^{\circ}$ , which is that of oxycumic acid, thus proving the presence of cymene.

#### FRACTION $186^{\circ} - 202^{\circ}$ .

On account of the small amount of this fraction, a combustion only could be made in order to ascertain the probable presence of linalool or a similar body.

- (1) 0.1372 gm. of substance gave 0.1340 gm.  $H_2O = 0.01488$  gm. H.  
and 0.4145 gm.  $CO_2 = 0.11304$  gm. C.  
(2) 0.13089 gm. of substance gave 0.1285 gm.  $H_2O = 0.01427$  gm. H.  
and 0.3749 gm.  $CO_2 = 0.1101$  gm. C.  
(3) 0.1289 gm. of substance gave 0.1322 gm.  $H_2O = 0.0149$  gm. H.  
and 0.3809 gm.  $CO_2 = 0.10388$  gm. C.

Calculated for  $C_{10}H_{18}O$ .

Found.

	I.	II.	III.
C. 77.92 per cent.	82.39 per cent.	78.08 per cent.	80.6 per cent.
H. 11.69 per cent.	11.84 per cent.	11.25 per cent.	11.6 per cent.
O. 10.37 per cent.	6.77 per cent.	10.67 per cent.	7.8 per cent.

These results do not agree very well, nor can the fractions after but one fractionation be considered pure. The amount of oxygen, however, makes the presence of some oxygenated substance like linalool probable.

May 31, 1896, about 30 pounds of young plants not yet in blossom were collected near Arena, Wis., by Prof. Cheney. From the partly dried herb about 118 grams of oil, or 3.39 per cent., were obtained by distillation with water vapor. The oil possessed a slightly reddish color, and had a sp. gr. of 0.925 at 20°. The rotatory power could not be taken on account of the dark color of the oil. A volumetric estimation of thymol was made.\*

- (1) (a) 4.4580 gm. of oil diluted to 13.0 Cc. with petroleum ether, and shaken with 5 per cent. soda solution until volume of ether solution remained unchanged and thymol was no longer indicated by Flückiger's reagent.

Loss of volume, 3.0 Cc. = 61.22 per cent. phenol.

- (b) Alkaline solution of thymol diluted to 100 Cc. with 5 per cent. soda solution.

(a) 10 Cc. of this solution required 73.5  $\frac{N}{10}$  I. sol. for precipitation of phenol, hence  $75.3 \times 0.0037415 = 61.68$  per cent thymol.

(b) A duplicate test gave identical results.

- (2) (a) 5.7887 gm. diluted to 13.3 Cc. lost 3.9 Cc., hence 61.9 per cent. phenol present.

(b) Alkaline solution of thymol diluted to 100 Cc. with 5 per cent. soda solution.

(a) 10 Cc. required 95.0  $\frac{N}{10}$  I. sol. for precipitation of phenol, hence present 61.4 per cent. thymol.

(b) A duplicate test gave identical results.

## TABLE OF RESULTS.

	Shaking-out Process.	As Thymol Iodide.
Experiment 1.....	61.22 per cent.	61.68 per cent.
Experiment 2.....	61.9 per cent.	61.4 per cent.

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2. Pharmaceutische Rundschau, vol. 13, p. 207, 1895.
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4. American Journal of Pharmacy, x, p. 113.
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\* For the details of this process compare the volumetric estimation of phenols by E. Kremers and O. Schreiner.



ON THE CHEMICAL COMPOSITION OF THE OIL OF MONARDA  
FISTULOSA (L).

BY E. J. MELZNER AND EDWARD KREMERS.\*

## INTRODUCTION.

A year ago a specimen of oil of Wild Bergamot was examined in this laboratory. It was found to contain about fifty per cent. of carvacrol. From the non-phenol constituents there were obtained cymene and an oxygenated fraction of a very high boiling point. Furthermore there was isolated a crystalline coloring matter resembling alizarin. The commercial importance of the discovery of so large a quantity of carvacrol in so common a plant, is alluded to in one of the closing paragraphs. A question of physiological interest is also alluded to in the following words:

"If the oils examined by previous investigators had been positively derived from *Monarda punctata*, one might be inclined to suppose that the two species *punctata* and *fistulosa* † produced two isomeric yet chemically distinct phenols, viz.: thymol and carvacrol. Under the conditions such a conclusion would be unwarranted at present—this all the more so, if one recalls the observations made in the laboratories of Schimmel and Co., e. g. that oil of thyme sometimes contains thymol, sometimes carvacrol, or both. This question of plant physiological interest can therefore be answered only after a longer and more careful study of the oils of both species of *Monarda*. Material for this purpose is already being collected."

The material to which reference is made in the above paragraph was collected weekly, as far as possible, and was obtained largely from the same field from which the previous material had been collected. There existed, however, a marked difference in the plants. The summer of 1895 having been exceedingly dry, the plants were rather small and on the whole did not possess a healthy appearance. A noticeable difference in the oils also existed. Whereas the oil distilled in 1894 was dark-red in color, that distilled in 1895 from the same field was on the whole of a light yellowish color. Even as in some instances, when the oil was slightly reddish in color when freshly distilled, this color disappeared upon standing. Further details with regard to conditions of the herb and of the peculiarities of the oil obtained therefrom will be given in a subsequent table.

It is of interest to note that a quantity of oil distilled from the herb growing under more favorable conditions and collected at a point only five miles distant from the former field, was dark red with a permanent dark red color.

It is still too early to state definitely from what part of the herb this

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\*Report of Research Committee.

† The plants from the two sources were identified by Prof. L. S. Cheney, of the University of Wisconsin.

coloring matter is obtained. It was thought at first to reside in the purplish stems. It was learned, however, that the presence or absence of those stems had no effect on the color of the oil. It may be worth mentioning in this connection that the yellowish oil was obtained from plants devoid of flowers, also with such in full blossom, but poorly developed seeds. On the other hand, dark red oil was obtained from plants in full blossom, in which the seed, that had already formed, seemed normally developed. It is too early, however, to attribute the coloring to the normally developed seeds. Possibly there is no relation between the two; the poorly developed seeds and the absence of volatile coloring matter being both due to the excessive drought. This subject, like other subjects pertaining to this oil, will be further investigated.

#### EXPERIMENTAL PART.

Inasmuch as the various specimens of the oils have been obtained at different intervals during the summer and early fall, it was of considerable interest to ascertain if the phenol constituent of these oils varied to any extent. Phenol determinations were therefore made of each separate specimen.

The following table contains an enumeration of the oils obtained from plants collected near Chandler Street at different times during the months of June, July, August and September, also statements with reference to the parts of plants used, specific gravity and rotatory power of oil, as well as the results of a crude phenol estimation.

No.	Date of Collection.	Description of Oil.	Part of Plants used.	Sp. gr. determined shortly after dist.	Sp. gr. determined in Jan. 1896.	Rotatory Power.	Percentage of phenols.
1	June 21, 1895	Light yellow	From leaves only.	0.931 July 25	0.931 at 24° C.	-3° 16' in 220 mm. tube	65.2 p.c.
2	June 26, 1895	Light yellow	From leaves only.	0.931, July 25	0.935 at 25.5° C.	-1° 10' in 100 mm. tube	67.6 p.c.
3	July 2, 1895	Yellow (turbid)	Leaves and stems.	0.932, July 25	0.939 at 20° C.	-2° 45' in 220 mm. tube	72 p.c.
4	July 9, 1895	Light yellow	Leaves, stems and buds.	0.936, July 25	0.939 at 23° C.	-2° 12.7' in 220 mm. tube	69.6 p.c.
5	July 16, 1895	Light yellow	Leaves, stems and some flowers.	0.932, July 25	0.937 at 21° C.	-1° 44½' in 220 mm. tube	66.8 p.c.
6	July 23, 1895	Light yellow	Leaves, stems, flowers and buds.	0.932, July 26	0.935 at 20° C.	-46' in 100 mm. tube	67.5 p.c.
7	July 30, 1895	Greenish yellow	Leaves, stems and flowers.	0.935, Aug. 2	0.941 at 15° C.	-1° 45' in 220 mm. tube	72 p.c.
8	Aug. 6, 1895	Light yellow	Stems, leaves, flowers and seed.	0.923, Aug. 8	0.9261 at 21° C.	-1° 1.7' in 100 mm. tube	65½ p.c.
9	Aug. 13, 1895	Light amber	Stems, leaves, flowers and seed.	0.921, Aug. 15	0.930 at 20° C.	-2° 8' in 200 mm. tube	70 p.c.
10	Aug. 20, 1895	Greenish yellow	Stems, leaves and buds.	0.927, Aug. 22	0.932 at 21° C.	-2° 3' in 220 mm. tube	64.4 p.c.
11	Sept. 3, 1895	Greenish yellow	Stems and leaves	0.916, Sept. 5	0.925 at 20.5° C.	-2° 12½' in 220 mm. tube	58 p.c.
12	*Aug. 9, 1895	Light amber	—	—	0.9311 at 20° C.	-1° 2.9' in 100 mm. tube	63 p.c.

\* Collected near Lake Wingra.

#### ESTIMATION OF CARVACROL.

The results of the carvacrol determinations recorded in Table I were ob-

tained by shaking 25 Cc. of the oil with 75 Cc. of a 10 per cent. solution of sodium hydroxide. The amount of oil not dissolved by the soda solution was read off and the difference was calculated as carvacrol.

It is known, however, that strong solutions of caustic alkali particularly not only dissolve phenols but other substances, hydrocarbons, alcohols, etc., as well. Oil No. 9, which when shaken but once with a 10 per cent. soda solution, showed a percentage of 70 per cent. of carvacrol, when shaken four times with a 5 per cent. solution of soda solution showed a percentage of only 54.8 per cent. carvacrol. Duplicate tests were made. The following table indicates the results of the repeated action of the soda solution on the oil in duplicate tests :

	I.	II.
First Reading.....	26 per cent.	30.8 per cent.
Second Reading.....	51.2 per cent.	52.4 per cent.
Third Reading.....	54.4 per cent.	55.2 per cent.
Fourth Reading.....	54.4 per cent.	55.2 per cent.

It thus becomes apparent that the amounts in Table I. have only a relative value.

Phenol determinations of the dark oil obtained from plants collected at Picnic Point were also made. In one estimation the oil, however, was diluted with an equal volume of petroleum ether. With a 10 per cent. soda solution the undiluted oil showed 65.2 per cent. and 65.6 per cent. respectively. Diluted with petroleum ether the oil showed with 10 per cent. soda solution, 60.4 per cent. and 60.8 per cent. respectively. 100 Cc. of undiluted oil shaken first with 300 Cc., and then with 100 Cc., and lastly with 50 Cc. of 5 per cent. soda solution, gave respectively in duplicate tests the following results :

	I.	II.
First Reading.....	42 per cent.	42.5 per cent.
Second Reading.....	52.5 per cent.	53.5 per cent.
Third Reading.....	56.5 per cent.	57.5 per cent.

#### VOLUMETRIC ESTIMATION OF CARVACROL.

5 Gm. of the oil, diluted with 10 Cc. of petroleum ether, were repeatedly shaken with 5 per cent. sodium hydroxide solution, until no more of the oil was dissolved. The oil was then tested for carvacrol by Flückiger's reaction, which consists in heating a few drops with chloroform and a little solid sodium hydroxide, when, if carvacrol is present, a wine-red color will appear. The absence of color will show that all of the carvacrol has been removed by the soda solution. The alkaline solution of carvacrol was made up with 5 per cent. soda solution to 100 Cc. or 200 Cc., as the case required. To 10 Cc. of this solution a sufficient quantity of  $\frac{N}{10}$  iodine volumetric solution was added to convert all of the carvacrol into carvacrol iodide. To effect this a slight excess of iodine was necessary. In order to know when a sufficient quantity of iodine had been added, a few

drops were removed from time to time, and added to some diluted hydrochloric acid. In this way free iodine can be detected as soon as it is in excess.

The mixture was then made up to 500 Cc., and filtered. The carvacrol iodide did not separate readily, but separation could be induced by agitation of the milky liquid. To 100 Cc. of the filtrate diluted hydrochloric acid was added, and the liberated iodine estimated with  $\frac{N}{10}$  sodium thiosulphate volumetric solution. The quantity of  $\frac{N}{10}$  sodium thiosulphate required, multiplied by 5, gives the quantity of  $\frac{N}{10}$  iodine solution that had been added in excess. From this the amount of iodine required can be easily found.

Every molecule of carvacrol requires four atoms of iodine, therefore every Cc. of  $\frac{N}{10}$  iodine volumetric solution is equivalent to 0.0037415 Gm. of carvacrol.

Only a few of the specimens of oil were tested according to this method.

No. of oil.	By titration.	By volume.*	Percentage by volume in 100 Cc. cylinder.†
1.	1st. 52 p. c.	64 per cent.	65.2 per cent.
	2d. 52.3 p. c.		
2.	1st. 54.7 p. c.	66 per cent.	67.6 per cent.
	2d. 54.3 p. c.		
7.	1st. 58.48 p. c.	70 per cent.	72 per cent.
	2d. 58.00 p. c.		
10.	1st. 53.20 p. c.	71 per cent.	64.4 per cent.
	2d. 53.40 p. c.		
	1st. 53.34 p. c.	64.5 per cent.	
	2d. 53.36 p. c.		
	1st. 54.46 p. c.	65.5 per cent.	
	2d. 54.26 p. c.		

#### ISOLATION OF CARVACROL.

The aqueous alkaline solution containing the sodium carvacrolate was distilled with water vapor to remove any dissolved non-phenol portions of the oil. The solution was then acidulated with 50 per cent. sulphuric acid and again distilled, the distillate being identified as carvacrol by means of carvacrol iodide, into which all of it was converted. In the flask there remained a dark brown, tarry residue. An attempt to sublime this between watch-glasses proved a failure.

#### NON-PHENOLS.

The combined portions of non-phenols from the various oils were distilled with water vapor. The first portion came over very clear, and then a much darker portion. These were kept separate. The light portion had a specific gravity of 0.847 at 21° C., and rotatory power of 24' in 220 Mm.

\* Burette reading. For further details see the volumetric estimations of phenols by Edward Kremers and O. Schreiner.—*Pharm. Review*, 14, p. 221.

† Taken for comparison from the first table.

tube. The dark portion had a specific gravity of 0.874 at 21° C., and rotatory power of 7°50' in 220 Mm. tube.

In order to ascertain the presence or absence of esters in this portion of the oil, the following ester determinations were made: 10 Cc. of the light portion were boiled for one hour with 50 Cc. of a 50 per cent. alcoholic potassium hydroxide solution. Upon titration of the alkali it was found that no saponification had taken place. The same experiment was tried with the dark portion, with like results.

The light and heavier oils were then fractionated separately, the results of the fractionations being recorded in the following table:

Fraction.	Light oil.	Heavy oil.	Total.
-170°	75 Cc.	18 Cc.	93 Cc.
170°-180°	55.5 Cc.	47 Cc.	102.5 Cc.
180°-190°	5.5 Cc.	10 Cc.	15.5 Cc.
190°-200°	2 Cc.	11.5 Cc.	13.5 Cc.
200°-220°		11 Cc.	11 Cc.

The corresponding fractions were then mixed and fractionated. The results of the second fractionation, together with quantity, specific gravity, and rotatory power of the fractions are recorded in the last table.

TABLE II.

Fraction.	Quantity.	Sp. gr. at 20° C.	$\alpha$ .*	$[\alpha]_D$ .
160°-165°	6.0 Cc.	0.8474		
165°-169°	8.0 Cc.	0.8438	-2°-1'	-2.37
169°-170°	8.5 Cc.	0.8460	-1°-3'	-1.77
170°-171°	11.0 Cc.	0.8427	-1°-2'	-1.22
171°-172°	9.0 Cc.	0.8628	-1°-0'	-1.15
172°-173°	16.0 Cc.	0.8488	-0°-10'	-1.19
173°-174°	20.0 Cc.	0.8682	-0°-8'	-1.15
174°-175°	25.5 Cc.	0.8440†	+0°-36'	+1.71
175°-176°	18.5 Cc.	{ 0.8652 at 4° 0.8480†	+1°-2'	+1.22
176°-177°	14.5 Cc.	{ 0.8663 at 4° 0.8502	+1°-34'	+1.84
177°-178°	11.0 Cc.	0.8547	+1°-25'	+1.67
178°-179°	10.5 Cc.	0.8528	+1°-35'	+1.88
179°-180°	9.0 Cc.	0.8573	+1°-44'	+2.02
180°-182°	8.0 Cc.	0.8649	+1°-35'	+1.83
182°-184°	9.0 Cc.	0.8650	+1°-58'	+2.23
184°-188°	7.8 Cc.	0.8686	+1°-45'	+2.01
188°-193°	.5 Cc.			
193°-198°	.5 Cc.			
198°-200°	2.5 Cc.			
200°-210°	3.5 Cc.			
210°-220°	3.0 Cc.			
220°-230°	1.0 Cc.			
230°-235°	2.0 Cc.			
235°-240°	11.5 Cc.	0.9430		
Residue.	3.0 Cc.			

\* In a 100 mm. tube at 20° C.

† At 24° C.

This table emphasizes what was demonstrated a year ago. More oil is being distilled this year, so that larger fractions of the non-phenol constituents may be obtained for a more detailed chemical examination.

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## WHAT IS THE NATURE OF THE MODERN DIETETICS USED IN MEDICINE AND PHARMACY?

BY F. E. STEWART, M. D.

Several queries in relation to various individual food preparations have been answered by papers read before the Association during the past three or four years. In reading them over I have noticed that no attempt has been made to give any general idea of the discoveries that have been made recently in dietetics.

It is the purpose of this paper to set forth some general principles regarding the class of substances which, in the hands of physicians of to-day, who are paying more attention than ever before to hygiene, are truly remedial agents and indeed perform this function. To-day the dietary in the hands of the medical fraternity plays a very important part in the treatment of diseases and the prevention of them.

### MODERN CLASSIFICATION OF FOODS.

Modern writers generally arrange foods in four classes, nitrogenous, oleaginous, amylaceous and mineral. The stimulating beverages, etc., are placed in a separate class and are known as food accessories. For convenience and for the purpose of setting forth modern views, foods may be divided into three classes: metabolists, inhibitors of metabolism, and stimulators of metabolism.

### METABOLISM.

The definition given for metabolism in Foster's Medical Dictionary is "the series of chemical changes occurring in nutritive material taken into an organism by which it is converted into an integral part of the living substance (constructive metabolism, anabolism), also the changes taking place in living substances by which energy is set free (destructive metabolism, catabolism). In the setting free of energy the complex material in the living substance is reduced to a simpler form, oxidation occurs, and carbon dioxide and other waste products appear."

### METABOLISTS. ALBUMINOUS OR NITROGENOUS FOOD. PROTEIN.

Life without metabolism is impossible; and metabolism without nitrogenous food is impossible also. Yeo states this fact in the following language: "Of these elements nitrogen is the most important, as it is the essential element of all *living* things; vital phenomena, the activity and change characteristic of all *living* things, are only found where this ele-

ment is present." On account of its unstable nature, and liability to spontaneous change, the nitrogen molecule of albuminous food is frequently called the protein molecule, or simply protein. Pflüger fed a very lean dog for many months on the leanest of meats, and required him to perform considerable labor, which consisted in drawing a cart. Zuntz says "The experiment showed that protein alone can satisfy all the functions of the animal body, and, provided the stomach can digest a sufficient quantity of it, an animal can live on protein alone. As is well known, this is true of no other nutrient."

#### INHIBITORS OF METABOLISM. OLEAGINOUS AND AMYLACEOUS FOOD.

One of the offices of the oleaginous and amylaceous food is to inhibit or slow-up the metabolism of albuminous food. The fats and the starches also supply the animal body with energy. The popular idea for a long time was that the ingestion of animal foods gave muscle and strength, and the fat of the food was stored in the body as fat to be consumed in keeping the body warm. As that impression still maintains in some quarters, it is well to consider the arguments that prove it is not true.

Foster calls attention to the fact that grass-fed cows give milk rich in butter, although only a small amount of fat enters their diet. Bees construct their cells out of wax (a fat of high melting point), yet their food is devoid of fat. The fats which occur in the animal body are mixtures of olein, palmitin and stearin in varying proportions, and the normal fat of each animal is characterized by the constant preponderance of one of the three. "In the fact of man and the carnivora palmitin is in excess over the other two. In the fat of herbivora stearin predominates, and in that of fishes olein. Butter contains, in addition to the above, several fats formed by the union of glycerin with the radicles of the lower acids of the acetic series."

Starch, like fat, is an albumen-saving food—that is, it inhibits the metabolism of the proteid molecule. It also supplies the body with energy, though not to the same extent as the fats. Then too it is a fat-saving food, as pointed out by Bauer, who says: "When fat and carbohydrates co-exist in the food, the latter are always first to be consumed; and when they are sufficient in amount, the consumption of fat may be completely suspended."

Sir William Roberts has pointed out the fact that starch in some form or other constitutes two-thirds of the food of man. Yeo says: "The carbohydrates by their capacity for rapid metabolism contribute largely to the production of heat and mechanical work, also their use greatly favors an increase of the constituents of the body, and especially of the albumen and fat."

From the above facts we are to draw the conclusion that "If we desire to increase the albumen without adding to the store of fat, we should give

a liberal allowance of albuminates with relatively small quantities of carbohydrates. But if we desire a substantial addition to the fat, the food should contain less albumen and more carbohydrates, with a fair proportion of fats."

#### STIMULATORS OF METABOLISM. CATABOLISTS. ALTERATIVES.

Bartholow classes the alkalies, alkaline and saline mineral waters, ammonium and its preparations, vegetable acids, iodine and mercury and their preparations, gold, silver, copper, zinc, etc., and the vegetable drugs colchicum, sarsaparilla, guaiac, etc., etc., among the agents promoting destructive metamorphosis, or increasing waste. Many of these substances are known as alteratives, or medicines which produce changes in the system without appreciably affecting the fluids or solids—a term which has deservedly fallen into disuse. This entire class of substances possess the power of stimulating metabolism, and eliminating waste matter from the system, thus clearing out the debris of tissue waste which has been hindering the action of the cells, and incidentally acting as restorative agents. Such agents are often of great value in treating diseases in which the waste materials from tissue destruction rapidly accumulate, such as consumption and the so-called wasting diseases.

#### ANIMAL FOODS.

Among the animal foods those most frequently dealt in by the pharmacist are beef juices, beef extracts and bouillon. The beef juices on the market, which are made by pressing the juice from a slightly broiled beef steak and concentrating the same in vacuo, contain about fifty per cent. of coagulable albuminous matter, also the salts and extractives of the meat. The salts of the meat are chlorides of sodium and potassium, potash, soda, lime, magnesia, iron, etc. It will be noticed that these mineral matters are found among the substances which stimulate metabolism. The extractive contains the leucomaines, creatin and creatinin. It is to the extractives that the pleasant appetizing odor and taste of the meat is due. The leucomaines are stimulants of metabolism, and resemble, in many respects, caffeine. While it may be true that the albuminous matter of meat is as nutritious with the extractives left out, yet their presence is of importance. They stimulate the appetite and digestion, and take part in the nutritive process. Dogs will not eat meat from which the extractives have been removed. Beef extract and bouillon contain little else than the extractives of meat, and, therefore, should be classed with the catabolists.

#### VEGETABLE FOOD.

The principal vegetable foods handled by the pharmacist are the infant foods. The important ingredient in many of them is starch. When it is considered that the saliva and pancreatic juice of infants is deficient in



diastase, the danger of feeding unmodified starches to very young children will be apparent. In the better class of these foods the starch has been partially digested by the action of heat. A most excellent infant food may be prepared economically by any pharmacist by filling an empty salt bag with wheat flour, firmly packing it, tying a string tightly around the mouth of the bag, and boiling bag and contents in water for eight or ten hours. The heat and moisture partially convert (digest) the starch so that it may be readily assimilated. During the process of boiling a rind forms on the outside of the flour in the bag. This should be pared off, and the flour rubbed through a sieve. It is afterward dried by exposure to the air, or in the open oven for a few minutes, to prevent fermentation, and then dispensed in wide-mouth bottles.

When used as a food two or three teaspoonfuls should be added to each feeding of milk, which has been previously diluted to the proper degree for the age of the child.

The above method of preparing an infant food received the endorsement of the Philadelphia Obstetrical Society, and a printed copy of the method was sent to the mothers of that city by the Society for the purpose of checking the diseases caused by improper diet in the summer time.

#### PRE-DIGESTED FOODS.

The popularity of predigested foods for infants and invalids is due, in great measure, to the writings of Sir William Roberts. Peptones, and pharmaceutic preparations containing them, have appeared to meet this demand. The digestive juices of animals and vegetables have been employed for pre-digestion; and the same results have in a measure been obtained by the use of heat applied by a Papin's digester. There is much excellent authority in favor of using foods which have been partially digested before eating. There are, however, certain objections to them which should not be lost sight of. In the first place, as pointed out by Roberts himself, the use of predigested foods is likely to do injury if not properly employed. When artificial aid is given the digestive apparatus, it commences to rely on the help afforded it, and when the patient is suddenly returned to natural food, an incipient rebellion may occur, in which the digestive apparatus goes on a strike. The transition from predigested to natural food should, therefore, be effected gradually. When used with caution their employment may often be the means of saving life and restoring the patient to health.

An ingenious theory in this connection has been presented by Sir William Roberts. He says:

"We will assume that the molecule of gelatinous starch consists of an aggregation of five molecules of soluble starch, and that the molecule of soluble starch consists of an aggregation of ten groups of the radical  $C_{12}H_{20}O_{10}$ . . . . The first act is the breaking up of the large molecule of

gelatinous starch into its component molecules of soluble starch. Then follows the progressive disintegration of the latter molecules into dextrine and maltose."

"We must conceive that the energy of the ferment is exercised in gradually pulling asunder the component groups or radicals of the unstable molecule of soluble starch—detaching one after another from the parent molecule—each radical as soon as detached assuming an atom of water and becoming an atom of maltose. At each detachment the parent molecule draws its remaining groups together to form a new kind of dextrine. As the process goes on the dextrine molecule becomes smaller and smaller—that is, contains fewer and fewer component radicals—the higher dextrines giving a red or brown coloration with iodine, but the lower dextrines giving no reaction with iodine."

Now before carbohydrate food can be appropriated for carrying on the nutritive processes it must first be stored in the liver as glycogen. This substance is a body allied to starch, for its elementary composition is  $C_6H_{10}O_5$ , or some multiple of this. Roberts calls attention to the close resemblance between the starch molecule and the glycogen molecule, and then points out a very important point in connection therewith. This is the point: Erethro-dextrine, acroo-dextrine, and the several other products which are formed while the starch molecule is being pulled down to the lower plane represented by maltose, glucose, etc., are readily diffusible, and are taken into the system before they are completely converted into these lower forms of sugar. It is obvious that much less energy is required to raise these *dextrines* to the plane of glycogen than to elevate the lower forms of *sugar* step by step to the higher level. As the learned author truly says, "what a useless waste of energy that would be." There is every reason to suppose, therefore, that starch is more nutritious than sugar, and that glucose is lower in the nutritive scale than any of the other sugars, because it is so much further removed from glycogen.

Prof. Chittenden, of Yale College, calls attention to another point which should be considered in this connection, and that is the probability that each of the dextrines formed by the cleavage of the starch molecule has a special part to play in nutrition, so that glucose and the lower forms of sugar are not fitted to do the work of the higher dextrines. Again, glucose is low in the list of energy-giving foods. The amount of energy yielded by one ounce of glucose when consumed in the body is 124 foot tons, while one ounce of starch is capable of yielding 138 foot tons, an ounce of albuminoids 173 foot tons, and an ounce of fat 378 foot tons. It is obvious, therefore, that glucose, as a predigested food, cannot rate with starch as a nutrient, neither can it become a rival with cod-liver oil as a food. It possesses comparatively little value as a tissue builder or a force producer. It has dropped low in station, and must be lifted up by the expenditure of much energy to the higher plane of organic matter occupied by glycogen before it can be utilized by the system.

It is very evident from the above that similar arguments can be urged against the various peptones on the market. The peptonized infant foods, invalid's diets, etc., all must be considered in the light of these facts. There can be little doubt that a pre-digested food is very different in many respects from a natural food; but it is equally true that they are of great value in the treatment of the sick if properly employed. Moreover, cooking itself is a form of pre-digesting, and such foods as meat and starch require cooking before they are fitted to be the food of man. It is the kind and degree of pre-digesting, therefore, that we should consider. Pre-digesting food by the agency of heat gives rise to one class of products, while the pre-digestion by animal and vegetable ferments gives rise to another. Furthermore, the products formed by the action of pepsin differ from those from pancreatin, and vegetable ferments form products which differ from either.

#### COD LIVER OIL.

I believe that all authorities now agree that cod liver oil has a dual action to perform as a therapeutic agent. It possesses the properties of a food and an alterative. As already stated the term alterative, while unscientific, means a class of agents that have the power of stimulating metabolism. No fat in itself has this power. On the contrary, the fats inhibit metabolism. This fact has long been recognized, though not until recently accounted for. Since 1822 chemists have been looking for the alterative principles of cod liver oil. It never seems to have occurred to them until recently that the many substances found in the oil did not belong to the oil, but are extraneous matters which the oil dissolves out of the liver during its preparation. Yet such is the fact, as I pointed out in my paper read before the Association last year. Neither is the color of the darker varieties of cod liver oil due to putrefactive products, as commonly supposed. The coloring matter also comes from the liver, and is due to the action of light on the animal substance composing it. It is a well known fact that meat, most vegetable juices, fruits, etc., darken on exposure. How soon this darkening occurs to the freshly cut surface of an apple! What a difference in color between the milky juice of the poppy and opium of commerce.

Now it is a fact pointed out by Mr. Möller that a cod liver oil prepared by submitting the fresh liver to the action of steam in an atmosphere of carbon dioxide, is free from coloring matter and other extraneous substances from the liver. In fact, it is pure fat, and plays the same part in nutrition as do the other fats. The alterative principles found in the liver which stimulate metabolism are gone, likewise the bile salts which assist in its digestion and absorption. Whether it now possesses any greater value as a fatty food over the fat of milk, and of meat, remains to be tested. That the latter are more agreeable to the palate all will admit.

In a recent article Dr. Winter of Washington calls attention to a danger to the reputation of cod liver oil as a therapeutic agent. He does not believe in giving the oil with the extraneous principles referred to left out, and warns the profession against confusing the action of the alterative principles with that of the fat. It is reasonable to suppose that the pale oils are inferior to the light brown oils for this reason. If care is taken to employ only fresh livers in preparing the latter, the product is just as palatable as the light colored oils. A dark brown oil may also be prepared from fresh liver, but the amount of time required, and the continued exposure of the oil to the heat (about 72 hours) drives off some of the volatile principles. The dark brown oils of commerce are usually made from putrid livers; but Isdahl & Co., of Norway, the largest producers of cod liver oil in the world, manufacture a fine quality of light brown oil from carefully selected fresh livers, which is preferred by many physicians in Europe.

#### ANIMAL EXTRACTS.

Of late there have come into more or less general use extracts made from various glands of the body, such as the testicles and thyroids, for which great merit has been claimed. The high authority of these statements entitles them to a respectful hearing. The subject is one now under investigation, but it will be many years before the whole truth can be obtained in regard to them, on account of the complexity of the problems involved. That various organs and tissues of the body elaborate principles which profoundly influence metabolism there can be no manner of doubt. There are toxins and anti-toxins, ptomains and leucomains, nucleins, etc., etc. All of these complex substances have parts to play which thus far are but imperfectly understood. The time may come, however, when each will be employed in medicine, so that a knowledge of them, and the methods for their preparation, should form part of the education of the pharmacist.

#### THE COMMON STIMULANT BEVERAGES.

The caffeinic stimulants, tea, coffee, cacao, kola, etc., all contain principles somewhat analogous to creatin, the leucomain found in lean meat, extract of beef, etc. The probability is that these substances are all stimulants to metabolism. Associated with the main active principle are certain volatile substances, and other active principles, which modify, to a greater or less degree, the alkaloid common to all.

The moderate use of the caffeine stimulants is commended by leading authorities; but they should never be used to spur over-fatigued nerves to greater dissipation. The proper remedy for fatigue is rest, not the whip; and he who forgets this fact will have occasion to regret it. Barks bears strong testimony in regard to the value of coffee to the soldier, as an in-

vigorous without relapse, and Yeo says that its influence in sustaining the human body under fatigue and privation is very remarkable. Kola seems to be more sustaining than coffee, and the United States Government is now engaged in extensive investigations to ascertain its true value as an emergency ration in the marching of troops.

#### ANTITOXIN.

BY CHAS. T. MCCLINTOCK, M. D.

Two years ago the medical world was startled by the announcement of an entirely new method and material for curing disease—antitoxin. Since that time, despite the opposition of the incredulous, in the face of the conservatives, who “knew that it was but another German fad,” antitoxin has come into practically universal use and approval. No discovery since that of quinine can take rank with this. What is this antitoxin? How does it work?

When it was shown that bacteria were the cause of certain diseases, it was believed for a time that if these bacteria by any means found an entrance into the body, disease must follow. Until quite recently popular writers on these questions left this impression with their readers. But as early as 1872 it was shown that when certain bacteria were injected into the circulation they rapidly disappeared. Later it was shown that blood outside the body could destroy bacteria. Pasteur noticed that in case an animal recovered from a germ-caused disease the germs disappeared from the blood and tissues. He also observed that, in some cases at least, after an animal had recovered from the attack it was more or less immune or insusceptible to the same disease. That this immunity following one attack was true for many of the contagious diseases was indeed a matter of common knowledge. Early in his investigations Pasteur noticed that some animals were readily affected by his microbes, while others were entirely immune; again, that in some cases a young animal could be infected, but not an older one. Pasteur studied these matters and worked out an explanation for them. We know to-day that Pasteur's explanation was wrong, but his facts were right. The germs do disappear with recovery from the disease, and there is generally more or less immunity or insusceptibility to the disease.

I have, so far, spoken only of the germ-destroying powers of the body. It may be necessary to point out that in avoiding or recovering from disease the body has to deal not only with germs but also with their products.

The harmful effects of germs are not, as a rule, due to their mere presence, but principally to the poisonous products which they elaborate. In the case of tetanus the germs are found only in the neighborhood of the wound, while their effects are manifested, it may be, in every nerve and muscle in the body. So in diphtheria, the germs are practically confined

to the upper air-passages, and yet we find the deleterious effects of the disease in every organ of the body. These effects may be produced experimentally by injecting the filtered culture of the germ, without there being a single germ in the body. The paralysis of diphtheria, or the tetanic convulsions of tetanus, can be produced at will in the laboratory with germ-free cultures.

These poisonous germ products, whether produced in our test-tubes or in the body, are called toxins. It is evident that if a child suffering from a severe case of diphtheria is to recover from the disease, it must be able not only to destroy the germs themselves, but also to dispose of or destroy the toxins produced. The substances capable of destroying these soluble poisons are known as antitoxins.

Under favorable conditions then the animal body can destroy a certain number of bacteria or a certain amount of the poisons produced by the germs. Can this poison-destroying power be increased?

For 15 years this has been *the* problem for the bacteriologist. It has been shown that by commencing with very small doses of the poison and by gradually increasing the dose, the body can be educated to destroy more and more of the poison, until at length in the favorable case thousands of times the amount that will kill an untreated animal is readily disposed of. This is the *first* principle underlying antitoxin, viz: we can by appropriate treatment increase the poison-destroying or disease-resisting power of an animal. The *second* is that we can borrow this power by taking some of the blood of this resistant animal, and loan it to another.

On these two facts serum therapy is based:

- 1st. We can increase the disease-resisting power,
- 2d. We can transfer this immunity to another animal or person.

We do not know what tissues or parts of the body produce the antitoxins. We can find them in various tissues, they are excreted in the urine, in the milk, and possibly in the fæces. For practical purposes, when we wish to borrow some antitoxin from an immunized animal, we do so by withdrawing a portion of its blood. This can be done with little pain or harm, and in turn we get a fluid that can readily be introduced into another animal or person. The methods for producing an antitoxin have been published many times, so that I do not need to repeat them. Allow me to say, however, that the process is one requiring the greatest of skill and care, and can only be safely carried out in well equipped laboratories. If I may so express it, antitoxin is a most delicate substance. It is contained in blood serum, the most complex of all known substances. It is altered changed or destroyed by age, light, extremes of temperature, chemical agents, exposure to air, contamination, etc. Certain of these agents under certain conditions destroy its antitoxic power only, but if it becomes contaminated not only is its potency destroyed, but it may become a powerful poison and disease-producing material.

It is for this reason that so much has been said about care in keeping and administering antitoxins, and it is for this that so much skill, care and reliability is demanded of the producers. .

Doubtless you think that it demands skill and training to safely handle and dispense poisons.

But the care demanded with strychnine is but as child's play to that that must be exercised in producing a safe, reliable antitoxin. Throughout the whole process, from planting the germs that are to produce the toxin, the testing of this poison on animals, the injection of the horses, the drawing of blood, separating the serum, testing it, bottling and handling, the strictest of aseptic procedure must be followed. Remember, again, that we are dealing with a most complex, delicate, evanescent body.

There have been some improvements in the production of serum that are worthy of note. A year ago, in a vial of 10 Cc. it was thought to be a very good serum if it contained 1000 units. Now we have one containing 5000 units, and I think it altogether probable that by the end of the year we can have a serum of such strength that a 10 Cc. bottle will hold 10,000 units. This is an important advance. To inject 10 Cc. into a child is a heroic procedure. But the injection of 1 or 2 Cc. is quite another matter. Two Cc. of this stronger serum is a full curative dose for an average case; 7 minims is an immunizing dose. There are certain unpleasant complications, urticaries, rheumatic pains, etc., that not uncommonly follow serum injections. In general these are proportional to the amount of serum used. We expect to note a very great diminution in the annoying sequelæ from these stronger serums. Allow me to call your attention to a mistake which I believe many practitioners are making. They argue in this way: "Ten cubic centimeters can be injected without harm. Now if I can get a serum that contains from two to five times the antitoxic power of that I have been using, I will inject the same amount, and will get control of the disease in proportion to the strength of the antitoxin." This, I believe, is mistaken reasoning. It is very well established that this serum is not directly antitoxic, *i. e.*, the serum that we give does not of itself destroy the poison. It in some way nourishes or stimulates the cells of the body, and they in turn destroy the toxin. It does not follow either in theory or in practice, that you will get this needed stimulus better from 5000 than from 1000 units. In fact, in so far as I can judge, from a somewhat careful examination of many reports, Behring's original recommendation, 250 units for immunizing, 500 to 600 for mild cases, 1000 for average, and 1500 for severe cases, repeated as necessary, still give the best results. On theoretic grounds I believe that even smaller doses, repeated more frequently, would give better results. Remember, the toxin is not produced all at once, but continuously through the course of the disease, so long as the germs are growing.

What are the results of treatment with diphtheria antitoxin? The Lan-

cet (England) special Commission, in a report published July 18, 1896, makes this statement :

"In the present stage of our knowledge it is not too much to say that the influence exerted by the exhibition of antitoxin on diphtheria is at any rate quite as marked as that exerted by quinine on malaria."

It is well within bounds to say that an average of the hospital reports from all over the world shows a decrease in the death-rate of at least fifty per cent. Here and there some belated traveller may be heard crying that we are on the wrong road, that trouble and disappointment alone await us. They said that the hospital figures were not correct, that we called things diphtheria now that were not formerly so called, and so raised our per cent. of cures. On the contrary, the bacteriologic method of diagnosis shows that hundreds of cases that we formerly called diphtheria were not such, and are not now included in the statistics. The objectors argued that when the results come in from the private practitioners the figures would be different. Yet in June the American Pædiatric Society published the answers they had received from 615 physicians in private practice, the most of whom made a specialty of diseases of children. The report says : "Of the 615 more than 600 were enthusiastically in favor of antitoxin." A special commission appointed by the German government reached practically the same conclusions. Ah ! but they say just as many people die of diphtheria now as ever. Behring has shown that the deaths from diphtheria in the German Empire for 1895 with antitoxin were 20,000 less than for the previous years without this treatment. Nothing short of a revelation from "on high" will convince some people, but the good-natured world smiles at them and goes on.

You have seen advertised and possibly have handled "dry" antitoxin. This is the serum that has been evaporated in vacuo to dryness. It retains its antitoxic power better than in the liquid form, but it is difficult to re-dissolve this material and the possibilities of contamination are very much increased ; for these reasons it has not come into general use.

If you have read much on this subject you have noticed that there have been many attempts to separate the antitoxin from the rest of the blood serum. So far the results are only partially successful. We do not know what antitoxin is. We do know that it is not this, that and the other constituent of blood serum, and by this process of exclusion we are sure that not  $\frac{1}{100}$  part of the serum used is antitoxin. And with our growing knowledge of the subject the hope is justified that some fortunate discoverer will be able to isolate this material and then a few grains will represent a full curative dose. This is a most potent substance. Of a first-class antitoxin  $\frac{1}{10000}$  Cc. or  $\frac{1}{100}$  grain, will completely neutralize or destroy ten times the fatal dose of poison for a guinea pig, and remembering that not  $\frac{1}{100}$  of the serum is antitoxin, you see that we have an agent of marvelous properties. To-day we use the animal body, the horse, to produce this



material. Not a few German investigators believe that with more knowledge and better methods we will be able to dispense with the horse's assistance and produce antitoxin directly from our bacterial cultures. The marvelous results obtained in diphtheria very naturally led to enthusiastic work in all the germ diseases. At first it seemed probable that the same methods could be applied and like results obtained in all of the communicable diseases. And yet, after an enormous amount of work done by careful and skillful investigators, the results obtained are on the whole very disappointing. Typhoid and cholera, tuberculosis and small-pox, are still unconquered. Why is it that a method applicable to diphtheria will not give as good results when applied to tuberculosis or typhoid? They have similar causes; the germs in these diseases as well as in diphtheria or tetanus can be isolated, pure cultures grown, toxins produced. The chief reason for the failure, I believe, is in this: In an ordinary case of diphtheria there are relatively few germs, confined to a very limited surface. But these germs produce a large amount of a very virulent poison, so much that every tissue of the body may feel its harmful effect. In tetanus this condition is even more pronounced. The germs are confined to the neighborhood of the wound, and are so few in number that the skilled bacteriologist must make repeated examinations, or cultures, to find them at all. And yet these few germs will in the average case produce sufficient poison to cause death. How does this compare with tuberculosis, for example? One estimate has it that in the last stages of this disease as many as four billions of the germs are expectorated in a day. This, I take it, without claiming any exactness for the figures, is a far greater number of germs than is produced in the entire course of a case of diphtheria or tetanus: yet in pure, unmixed, non-septic tuberculosis, the amount of toxin produced, measured by the temperature curve and general symptoms, is small. To illustrate: take a tetanus toxin grown in bouillon from an old and presumably weakened germ, with no attempts to increase its virulence. Of this  $\frac{1}{5000}$  Cc. is fatal to guinea pigs. Then the toxin from the tubercle germ, grown as carefully as can be. This has been concentrated to one-tenth of the original bulk, and yet it requires from 2 to 5 Cc. to kill a guinea pig. At the lowest estimate the tetanus toxin is 10,000 times as strong as that obtained from the tubercle germ. Conversely, it is probably a safe estimate to say that in the average fatal cases of these two diseases, there are a million times as many tubercle germs produced as in the case of tetanus. I believe I am justified in saying that in tetanus it is the toxin that kills, while in tuberculosis it is the germs. The old name consumption is correct, the disease is a literal eating up of the tissues by the germs. Bearing these things in mind, the success of the method in the one case and its failure in the other can be understood. To cure tetanus we need an antitoxin, while for the cure of tuberculosis we must have a germicide. The antitoxins of tetanus and diphtheria are not

germicidal. Such an agent is not needed ; free the tissues from the harmful effects of the poisons and they will easily take care of the few germs present. But not so with tuberculosis. Neutralize or destroy all the toxin and you still have left in an advanced case untold millions of germs, feeding on and literally eating up the tissues in which they are located. It is evident from these considerations that we need different remedial agents in these two classes of disease. In the one case we are to destroy a soluble, chemical poison : in the other we have vast numbers of living, growing bacteria to dispose of. Now the body normally has both of these powers, germicidal and antitoxic, but these powers are different, not the same thing, probably not the functions of the same tissues. In immunizing a horse to diphtheria we enormously increase the power of its blood to destroy the poison of the germs, but this blood has no more ability to kill the germs themselves than the blood of an untreated horse.

The bacteriologists have learned these facts, and with more or less success are attempting to increase this germ-killing power of the body. At the present time there are three serums that are generally regarded as successful. The first of these is that for diphtheria ; the second in rank, although discovered before that for diphtheria, is the one for tetanus or lock-jaw. The third is that for the streptococcus diseases, and complications, as erysipelas, child-bed fever, scarlet fever, etc. I have taken enough of your time with the anti-diphtheritic serum.

As said, the anti-tetanic serum was discovered first, but as lock-jaw is rather a rare disease, and probably owing to the fact that the news of this discovery was too good to believe, but little attention was paid to this discovery until after the serum for diphtheria was announced. As an experimental remedy tetanus antitoxin is better, more powerful than that for diphtheria. In practice, however, it is not so successful. This is due to the fact that we have no means of recognizing tetanus early in the disease ; as a rule, the locked jaws is the first thing that gives us our diagnosis. Now, as you know, antitoxin has no healing power. It is what the name indicates—a poison opposer or destroyer. If in diphtheria the poison has acted long enough to produce paralysis of the throat or kidneys, or in tetanus to induce the tetanic contractions that lock the jaws, no amount of antitoxin will cure the condition. All that it can do in such a case is to prevent the further action of the poison, and if irreparable injury is already done, your serum is powerless. It is for this reason that so much stress is laid on the early administration of the serums ; for this that the tetanus antitoxin so often fails. If we take two guinea pigs and give to each a fatal dose of the tetanus toxin and at once give one of them some of the antitoxin, then wait two days before treating the second one, we will find that it requires more than 1000 times as much antitoxin to save the second pig. If a small preventative dose of tetanus antitoxin was given at once in every case of suspicious, dirt-infected wound, serious results from this

disease would scarcely be known. Even as it is, with the antitoxin given late in the disease, the mortality is reduced from about 80 to 20 per cent.

The history of anti-streptococcic serum is an interesting one, but I will not take your time to give it. Thus far the reports from its use are very favorable.

In addition to these three serums that are generally regarded as successful, there are quite a number of others that have been claimed by their discoverers to be more or less successful. Thus we have two or more serums produced by different methods for the treatment of cancers. Others for cholera, tuberculosis, pneumonia, hydrophobia, snake poison, typhoid fever, syphilis and small-pox. These serums are as yet in the experimental stage; time alone can show their value. On the whole the results are not promising. But the work is not lost. In the study of this subject we are learning more and more of the cause of disease, and steadily the belief grows that disease can be conquered; that knowing the cause and the methods of many disease processes, we can and will find preventative or curative measures. Men have for ages sought to find specific remedies for diseases. There are but few substances, mineral, vegetable, animal, or the products of the chemist, that have not been tried. These attempts have been well summarized by Rossbach, as follows: "For thousands of years mankind has experimented in this direction, and the result has been the discovery of but four remedies for three diseases. It would be a terrible idea, that some other thousand years were necessary to detect another four remedies. The usual way of proceeding is too dangerous. Especially harmful proves the enthusiasm, not to say dishonesty, of many observers. If by chance, a physician has found a remedy, after the application of which one or two cases of an infectious disease have quickly recovered, the success is at once attributed to the medicine. No thorough investigation on a larger scale is made; the new 'specific' has been discovered and is emphatically recommended."

We are learning better methods. Before attempting to find remedies we study the etiology of a disease. Having found the cause—its noxious principles—the way in which it harms, we then endeavor to discover the agents with which the body combats the "disease powers." Then, and not till then, are we in a position to intelligently seek for remedies. With this method, medicine seems to be entering on a new day.

#### PEPSIN TEST.

ANSWER TO QUERY NO. 20 OF THE SECTION ON SCIENTIFIC PAPERS.

BY C. C. SHERRARD, PH. C. & J. L. TEGARDEN, PH. C.

We need to make no apology for continuing the discussion of the pepsin question, for at least two reasons. In the first place query No. 20 is entitled to an answer, as well as the numerous papers which have been

published upon the subject within the last year, indicating the unprecedented interest in, and the apparent unreliability as to the accuracy of the U. S. P. test. Secondly, the question deserves more than ordinary consideration because of the important position pepsin holds as a medicinal or therapeutic agent.

It was asserted in the discussion at the meeting of the American Pharmaceutical Association at Denver, that the pepsin question had become threadbare, and that further consideration of the subject was not only uninteresting, but consumed time that might better be devoted to other matters. Such an opinion, however, is not the judgment of the Committee on Scientific Papers. The papers presented last year, as well as the present ones, were in response to their queries. The assertion that pepsin is only valuable as a pharmaceutical agent to produce peptones, and that physicians are coming to see it in that light, and on that account are ceasing to prescribe it, does not seem to be borne out by the facts.

On referring to the analysis of 27,000 prescriptions by Prof. E. L. Patch of Boston, reported at the Denver meeting, we find figures that prove strongly the importance of pepsin as a medicinal agent, and that those who had decried its value had not properly studied its worth from a physician's standpoint, and were, therefore, not able to appreciate the general interest taken in the subject.

We must all admit that it is the place of the pharmacist to supply the demand for medicines, made by the public and the physician. We must also admit that the effort to see that this demand is supplied with pure standard drugs is one of the cardinal principles of this Association. This fact should also be taken into consideration, for the amount of pepsin used annually in the United States by the people at large without prescriptions amounts to many thousand pounds.

Referring again to the compilation of prescriptions by Prof. Patch, and selecting therefrom a number of important remedial agents, we can see at a glance the comparative recognized value of pepsin by the physician. We find among the 27,000 prescriptions that pepsin, either alone or as a cordial essence, elixir, etc., saying nothing about its compounds with bismuth, nux vomica, phosphorus, etc., etc., was used 994 times.

Aconite, including the alkaloid aconitine.....	534	1.9 per cent.
Ammonia and all its compounds.....	1772	6.5 per cent.
Arsenic, including its compounds.....	671	2.4 per cent.
Belladonna, including the alkaloid atropine.....	866	3.2 per cent.
Bismuth and all its compounds.....	1227	4.5 per cent.
Cascara and its compounds.....	380	1.4 per cent.
Cinchona and its compounds.....	397	1.4 per cent.
Cocaine and its compounds.....	309	1.1 per cent.
Distilled water.....	1696	6.2 per cent.
Iron and all its compounds.....	1353	5.0 per cent.
Mercury and all its compounds.....	2247	8.0 per cent.

Morphine and its salts.....	1193	4.4 per cent.
Nux Vomica.....	1404	5.2 per cent.
Opium and its compounds.....	1789	6.6 per cent.
Pepsin, not including all its compounds.....	994	3.6 per cent.
Pepsin, including all its combinations.....	1461	5.4 per cent.
Phenacetin.....	775	2.8 per cent.
Potassium and its salts and compounds.....	2545	9.4 per cent.
Quinine and its salts.....	1933	7.1 per cent.
Salicylic acid.....	276	1.0 per cent.
Salol.....	386	1.4 per cent.
Sodium and its salts and compounds.....	2334	8.2 per cent.
Water.....	1249	4.7 per cent.

Prof. Patch's list embraces 1777 items and 27,000 prescriptions. Out of this large number of prescriptions we find but twelve items, including water, used oftener than pepsin and its solutions, and but eight items used oftener than pepsin and its compounds. Our effort, therefore, to keep alive the interest extant in query No. 20, surely deserves the attention and support of our ablest pharmacists and chemists.

So much concerning the importance of pepsin as a medicinal agent, judged from its extensive use by the practicing physician and the public in general.

The variable results obtained by different assayers are accounted for largely in a paper by C. C. Sherrard,\* on "Solubility of Hard Boiled Egg Albumen, etc.," read at the Denver meeting. It is gratifying to know that the observations therein recorded have been fully verified by Mr. J. M. Lear† in the Laboratory of the University of Kansas.

The information furnished in these articles, we believe, will be of evident assistance to the committee of revision of the next Pharmacopœia.

The following table shows comparative results in the same pepsins by different operators. In general they are quite uniform.

Number.	C. C. Sherrard and J. L. Tegg- arden.	H. H. Waters.	H. W. Snow.	W. F. Jackson.	Number.	C. C. Sherrard and J. L. Tegg- arden.	H. H. Waters.	H. W. Snow.	W. F. Jackson.
1	1-2350	1-2250	1-1666	1-2863	7	1-1500	1-2050	1-1500	—
2	1-2900	1-2600	1-2142	—	8	1-2250	1-2250	1-1875	1-2009
3	1-1650	1-1600	1-1666	1-1875	9	1-100	1-00*	1-500†	—
4	1-3000	1-2850	1-3000	1-3000	10	1-500	1-60	1-535	—
5	1-3000	1-3000	1-3000	1-3000	11	1-1375	1-1000	1-1000	—
6	1-1125	1-1400	1-1000	—	12	1-1650	1-1875	1-1875	—

\* Practically inert.

† Less than.

\* Proc. A. Ph. A. 1895, p. 231-232.

† Bul. of Pharmacy, July 1896, p. 298.

It should be noticed that the intent of the U. S. P. standard is 1 to 3000, for immediately following the pharmacopœial definition we find this statement: "If it be desired to use a diluent for reducing pepsin of a higher digestive power to that required by the Pharmacopœia, Sugar of Milk should be employed for that purpose."

In arriving at our own conclusions, we made a series of assays and finally ran three sets of different strengths of the same pepsin, two of these sets being duplicates. At the end of the allotted time each of us made his notation as to results, neither of us knowing the other's readings. Forty-two tests were made with each pepsin. We are, therefore, confident that our results are about as nearly correct as present methods can make them, and it would be a waste of time to comment upon other people's results. Difference in the condition of albumen has something to do with it, but when a pepsin tests nearly the same day after day, with different batches of albumen, it is not so difficult to arrive at a fairly close approximation of its real value.

In view of all that has been said and done upon this aggravating subject, we would suggest that a committee of not less than five chemists be appointed to carry on investigations and report upon an assay method which will yield such positive results that no room can be left for controversy.

#### UNITED STATES PHARMACOPŒIAL PEPSIN STANDARD COMPARED WITH FOREIGN PHARMACOPŒIAL STANDARDS.

BY C. C. SHERRARD, PH. C.

So much has been said at state and national conventions and in pharmaceutical journals about pepsin testing, that I had considerable hesitancy in presenting this item of current pharmaceutical history. A very extended amount of experimental and practical work, based upon numerous inquiries from the foreign countries mentioned below, prompted me to furnish this compilation.

The points of information desired are the outgrowth of a considerable demand for the better grade of American pepsins. It is desirable, therefore, to know what a U. S. Ph. 1-3000 pepsin will test according to the various European pharmacopœias, or the strength indicated by their pepsins when assayed according to the U. S. Ph. method, together with the sugar of milk necessary to reduce a U. S. Ph. article to the various standards.

By consulting the table it will be noticed there is a wide variation in the time allotted, temperature, amount, kind and condition of albumen or proteids, acidity, kind of sieve, and percentage of pepsin used in applying the test. Any one of these variations causes a greater or less difference of end results.

The last column but two shows the approximate strength when reduced

to the U. S. Ph. standard ; the last column but one gives the approximate strength of a U. S. Ph. pepsin when tested by the various other standards, and the last column indicates the amount of sugar of milk necessary to reduce a U. S. Ph. pepsin to the other standards.

The following are the descriptions and requirements for official pepsin of the various pharmacopœias :

[*Translation.*]

AUSTRIAN PHARMACOPEIA.

A fine white powder or slightly yellowish, of no taste or smell, does not form a clear solution in water, but the addition of a few drops of hydrochloric acid makes the solution quite clear.

One decigramme of pepsin with 50 grammes of water and  $2\frac{1}{2}$  grammes of hydrochloric acid added to 10 grammes of albumen of boiled egg well pounded and left to stand for six hours at a temperature of  $40^{\circ}$ , will leave the solution only slightly turbid.

[*Translation.*]

BELGIAN PHARMACOPEIA.

A squamous substance, either amorphous or in powder, and of a greyish white color, has no putrid animal smell or any taste.

It is affected by humid atmosphere and forms a turbid solution with water.

If 25 centigrammes of pepsin are dissolved in 25 grammes of water, and to these are added 40 centigrammes lactic acid and 10 grammes of moist fibrine, and left to evaporate for twelve hours, at a temperature of  $45^{\circ}$ , a greyish solution will be the result, which is not precipitated by nitric acid.

BRITISH PHARMACOPEIA.

PEPSIN.

A preparation of the mucous lining of the fresh and healthy stomach of the pig, sheep or calf. It may be prepared as follows :

The stomach of one of these animals recently killed having been cut open and laid on a board with the inner surface upwards, any adhering portions of food, dirt, or other impurity, are to be removed and the exposed surface slightly and rapidly washed with a little cold water ; the cleansed mucous membrane is then to be scraped with a blunt knife or other suitable instrument, with some pressure, and the viscid pulp thus obtained is to be immediately spread over the surface of glass or glazed earthenware and quickly dried at a temperature not exceeding  $100^{\circ}$  F. ( $37.8^{\circ}$  C.). The dried residue is to be reduced to powder and preserved in a stoppered bottle.

*Characters and Tests.*—A light yellowish-brown powder, having a faint but not disagreeable odor, and a slightly saline taste, without any indica-

tion of putrescence. Very little soluble in water or spirit. Two grains of it with an ounce of distilled water, to which five minims of hydrochloric acid have been added, form a mixture in which at least 100 grains of hard-boiled white of egg, passed through wire gauze of 36 meshes per linear inch and made of No. 32 brass or copper wire, will dissolve on their being well mixed, digested, and well stirred together for thirty minutes at a temperature of 130° F. (54.4° C.)

*Dose*—2 to 5 grains.

[*Translation.*]

DANISH PHARMACOPŒIA, 1893.

A fine greyish white powder with a peculiar weak smell and taste, and is frequently somewhat sweetish. By mixing one part of pepsin with 100 parts of water a somewhat turbid solution is obtained that has a slight acid reaction; it becomes clear if a small quantity of muriatic acid is added to it. The same effect is obtained by boiling the liquid and adding to it a similar quantity of alcohol. The pepsin can dissolve 100 times its own weight of the white of egg, which can be demonstrated in the following manner:

An egg is placed for ten minutes in boiling water and the white, when cool, pounded and passed through a sieve No. 10. Of the white of the egg thus treated, 10 grammes are mixed with 100 grammes of water at 50° C. and 30 drops of muriatic acid, to which is then added 0.1 gramme of pepsin, and the mixture kept at a temperature of 45° C., stirring it frequently with the thermometer. At the expiration of two hours the white of the egg will be completely dissolved, there being scarcely any particles of albumen left. It must be kept in a well-stopped bottle.

[*Translation.*]

FRENCH PHARMACOPŒIA.

PEPSIN.

Medicinal Pepsin consists of a greyish white powder which is a mixture of "Pepsin Extractive" and starch. It has an odor which recalls that of rennet, but possesses nothing whatever of a putrid smell. It is partially soluble in water.

Pepsin Extractive is obtained from the stomach of a pig, and also from the rennet of sheep and calves. It ought to dissolve in water without leaving any sensible residue.

*Test.*—Medicinal Pepsin in powder should respond to the following test:

Introduce into a small bottle with a large opening,

Medicinal Pepsin.....	0.50 gramme.
Distilled Water.....	60 grammes.
Hydrochloric Acid.....	0.60 gramme.
Pork fibrine recently washed and dried.....	10 grammes.



Place the bottle in a hot water bath, the temperature of which ought to be maintained at  $50^{\circ}$  C. and let it digest for six hours, taking care to agitate it frequently until the fibrine is completely dissolved, when about ten cubic centimeters of the liquor, cold, ought not to become cloudy by the addition of twenty to thirty drops of azotic (nitric) acid.

*Observe.*—Pepsin Extractive ought to respond to this test in the dose of 20 centigrammes only.

[*Translation.*]

GERMAN PHARMACOPŒIA.

*Pepsinum—Pepsin.*

A fine, almost white and but slightly hygroscopic powder with an odor similar to bread, and taste sweet, afterwards somewhat bitter. 1 part dissolves in 100 parts of water giving a somewhat turbid solution, with a scarcely acid reaction.

The white from an egg which has lain for ten minutes in boiling water, when cold, to be rubbed through a sieve for coarse powders. 10 grammes of this divided albumen to be mixed with 100 Cc. of warm water at  $50^{\circ}$  and 10 drops of hydrochloric acid, to which is then added 0.1 gramme pepsin. After standing during 1 hour at  $45^{\circ}$ , having been shaken repeatedly during that time, the albumen must have disappeared with the exception of a few yellowish-white flakes.

[*Translation.*]

SWISS PHARMACOPŒIA. 1893.

A fine powder, almost white, often a little clotty, possessing a peculiar odor of leaven, has a sweetish taste, sometimes an after bitter and salt taste. When one gramme of pepsin is mixed with a little warm water and the mixture diluted to 100 parts and slightly shaken, a solution should be obtained having a reaction slightly acid, never alkaline. This solution is a little opalescent, several drops of hydrochloric acid renders it sufficiently clear for it to appear limpid. It ought not to coagulate on warming, and ought not to precipitate on the addition of alcohol. At the utmost it might become turbid.

The test for pepsin is made as follows: Boil an egg for five minutes in water. Rub the white of the egg when cold through sieve No. 3. Mix, warming slightly, 10 grammes of the white of egg with 100 grammes of water, at a temperature of  $50^{\circ}$ , and 2 grammes of dilute hydrochloric acid. Add one decigramme of pepsin, dissolve in the water and allow it to digest at  $40^{\circ}$  C., taking care to shake it frequently. After one hour, or at the most two hours, the albumen should be dissolved with the exception perhaps of a few yellowish flakes. If the mixture is allowed to digest for five hours longer and then twenty to thirty drops of dilute nitric acid added to a few Cc. of the mixture, it ought to be scarcely turbid.

[*Translation.*]

## ITALIAN PHARMACOPŒIA, 1893.

The pepsin of commerce is a solid, amorphous substance, either powdered or granulated, or else in minute scales, and of a yellowish or grayish color. It occurs, also, sometimes as a soft paste of a more or less viscous nature. But the characteristic properties of all these varieties are the same. They are soluble in water or glycerin, but not soluble in either alcohol or ether. Dissolved in glycerin it keeps for a long time. The solutions of pepsin are precipitated by acetate of lead, but neither by acetic acid, nor by a mixture of the latter with ferrocyanide of potassium, nor by tannic acid, nor by perchloride of mercury. The solution changes at about 60° C.

At a temperature of 37° C., and in the presence of some diluted acids, especially of muriatic acid, pepsin dissolves albuminous substances, converting them into peptone.

Ten grammes of coagulated white of egg, cut into minute pieces and mixed with 100 gms. of water, 0.25 gms. of muriatic acid, and 0.50 gms. of pepsin, will, after having been kept for 12 hours at a temperature of 38°–40° C. form a liquid that, after filtration, will not become precipitated by boiling, nor by the gradual addition of nitric acid, nor even when neutralized by carbonate of ammonia.

N. B.—For preserving it, it is best to mix it with an equal quantity of starch (*pepsina amilacaca*). The test is made as above, but with double the quantities named.

[*Translation.*]

## NORWEGIAN PHARMACOPŒIA, 1895.

A yellowish or greyish powder of a peculiar smell and occasionally of a somewhat sweetish taste. One part of pepsin, when mixed with 100 parts of water, produces a turbid solution that has a weak acid reaction, which becomes clear when a few drops of muriatic acid are added to it. The same effect is produced by boiling the liquid and mixing it with an equal quantity of alcohol.

The pepsin will dissolve a hundred times its own weight of albumen, which is demonstrated in the following manner :

Ten grammes of the white of an egg, after being kept for ten minutes in boiling water, is pounded into a thick paste and mixed with 100 grammes of water at 50° C. and 0.1 gramme of pepsin and 30 drops of muriatic acid, after which the mixture is kept at a temperature of 45° C., stirring it frequently, and at the expiration of two hours the white of the egg will be completely dissolved, leaving scarcely any whitish particles behind.

## [Translation.]

## SPANISH PHARMACOPŒIA, 1884.

A gramme of medicinal pepsin should dissolve 10 grammes of dry fibrin when submitted to the following test :

Distilled water.....	50.0 grammes.
Hydrochloric acid of 22°.....	0.5 “
Medicinal Pepsin.....	1.0 “
Dry fibrin.....	1.0 “

Pour the whole into a wide mouthed bottle, and place the mixture in a stove heated to a temperature of 50° for 6 hours, shaking it from time to time. At the expiration of that time, the fibrin will have dissolved completely.

## UNITED STATES PHARMACOPŒIA, 1890.

## PEPSINUM—PEPSIN.

A proteolytic ferment or enzyme obtained from the glandular layer of fresh stomachs from healthy pigs, and capable of digesting not less than 3000 times its own weight of freshly coagulated and disintegrated egg albumen, when tested by the process given below.

If it be desired to use a diluent for reducing Pepsin of a higher digestive power to that required by the Pharmacopœia, Sugar of Milk should be employed for that purpose.

A fine, white, or yellowish white, amorphous powder, or thin, pale yellowish or yellowish transparent or translucent grains or scales, free from any offensive odor, and having a mildly acidulous or slightly saline taste, usually followed by a suggestion of bitterness. It slowly attracts moisture when exposed to the air. Soluble, or for the most part soluble, in about 100 parts of water, with more or less opalescence ; more soluble in water acidulated with hydrochloric acid ; insoluble in alcohol, ether, or chloroform.

On heating a solution of pepsin in acidulated water to 100° C. (212°F.), it becomes milky, or yields a light, flocculent precipitate, and loses all proteolytic powers. In a dry state it can bear this temperature without injury.

Pepsin usually has a slight acid reaction. It may be neutral, but should never be alkaline.

*Valuation of Pepsin.*—Prepare first the following solutions :

*A.* To 294 Cc. of water, add 6 Cc. of diluted hydrochloric acid.

*B.* In 100 Cc. of solution *A*, dissolve 0.067 Gm. of the Pepsin to be tested.

*C.* To 95 Cc. of solution *A*, brought to a temperature of 40° C. (104°F.), add 5 Cc. of solution *B*.

The resulting 100 Cc. of liquid will contain 2 Cc. of diluted hydrochloric acid, 0.00335 Gm. of the Pepsin to be tested, and 98 Cc. of water.

Immerse and keep a fresh hen's egg during fifteen minutes in boiling water; then remove it and place it in cold water. When it is cold, separate the white, coagulated albumen, and rub it through a clean sieve having 30 meshes to the linear inch. Reject the first portion passing through the sieve. Weigh off 10 Gm. of the second, cleaner portion, place it in a flask of the capacity of about 200 Cc.; then add one-half of solution *C*, and shake well, so as to distribute the coherent albumen evenly throughout the liquid. Then add the second half of solution *C*, and shake again, guarding against loss. Place the flask in a water-bath or the thermostat, kept at a temperature of 38° to 40° C. (100.4° to 104°F.), for six hours, and shake it gently every fifteen minutes. At the expiration of this time the albumen should have disappeared, leaving at most only a few, thin, insoluble flakes.

(Trustworthy results, particularly in comparative trials, will be obtained only if the temperature be strictly maintained between the prescribed limits, and if the contents of the flasks be agitated uniformly, and in equal intervals of time.)

The relative proteolytic power of pepsin stronger or weaker than that described above may be determined by ascertaining, through repeated trials, how much solution *B*, made up to 100 Cc. with solution *A*, will be required exactly to dissolve 10 Gm. of coagulated and disintegrated albumen under the conditions given above.

Number.	Name of Pharmacopoeia.	Strength claimed.	Temperature.	Time.	Per cent. of acid.	Amount of dilution.	Length of time eggs are boiled.	Kind of proteid substance used.	Condition of albumen or fibrin.	Amount of albumen or fibrin.	Amount of pepsin used.	Per cent. of pepsin used.	Approximate strength according to U.S.P. standard.	Approximate strength of U.S.P. pepsin when tested by other standards.	Amount of dilution necessary to reduce to other standards.	
															Pepsin.	Sug. Milk.
1	Austrian .....	1-100	40° C.	hr. 6 00	.80 HCl.	50 cc.	Boiled. No time stated.	Egg albumen	Well pounded.	.10 Gm.	.1 Gm.	1 per cent.	1-100	1-2500 to 1-3000	1½ Gms.	28½ Gms.
2	Belgian.....	1-40	40° C.	12 00	Lactic acid	25 cc.	No time stated.	Moist fibrin.	Not stated.	.10 Gm.	.25 Gm.	2½ per cent.	1-15			
3	British .....	1-50	54.4 C.	30	.328 HCl.	30 cc.	Hard boiled. No time stated.	Egg albumen	Passed through 36 mesh sieve.	.648 Gm.	.120 Gm.	2 per cent.	1-600	1-250	6 Gms.	24 Gms.
4	Danish.....	1-100	45° C.	2 00	.505 HCl.	100 cc.	10 min.	Egg albumen	No. 10 sieve. meshes not known.	.10 Gm.	.1 Gm.	1 per cent.	1-300	1-2000	1½ Gms.	28½ Gms.
5	French.....	1-20	50° C.	6 00	.334 HCl.	60 cc.	No time stated.	Pork fibrin.	Not stated.	.10 Gm.	.5 Gm.	5 per cent.	1-15	1-2500 to 1-1200	½ Gms.	20½ Gms.
6	German .....	1-100	45° C.	1 00	.168 HCl.	100 cc.	10 min.	Egg albumen	Coarse powder No. 3 sieve. meshes not known.	.10 Gm.	.1 Gm.	1 per cent.	1-500	1-1500 to 1-2000	2½ Gms.	27½ Gms.
7	Swiss.....	1-100	40° C.	1-2 hr.	.80 HCl.	100 cc.	5 min.	Egg albumen	Cut in minute pieces.	.10 Gm.	.1 Gm.	1 per cent.	1-400	1-2000 to 1-1800	1½ Gms.	28½ Gms.
8	Italian .....	1-20	38-40° C.	12 00	.08 HCl.	100 cc.	Coagulated. No time stated.	Egg albumen	Mashed to a paste.	.10 Gm.	.5 Gm.	5 per cent.	1-10	1-2000 to 1-3000	½ Gms.	20½ Gms.
9	Norway .....	1-100	45° C.	2 00	.505 HCl.	100 cc.	10 min.	Egg albumen	Not stated.	.10 Gm.	.1 Gm.	1 per cent.	1-300	1-2000 to 1-3400	1½ Gms.	28½ Gms.
10	Spanish .....	1-10	50° C.	6 00	.11 HCl.	50 cc.	No time stated.	Dry fibrin.	Passed through No. 30 mesh sieve.	.10 Gm.	.1 Gm.	10 per cent.	1-8		½ Gms.	20½ Gms.
11	U. S. Ph.....	1-3000	38-40° C.	6 00	.20 HCl.	100 cc.	15 min.	Egg albumen		.10 Gm.	.00335 Gm.	⅓ per cent.	1-3000		30 Gms.	∞ Gms.

Column *m* shows the approximate strength of the foreign pharmacopœial pepsins when submitted to the United States Pharmacopœia test.

Column *n* shows the approximate strength of a pepsin which assays 1-3000 according to the United States Pharmacopœia test when submitted to the respective tests of other pharmacopœias.

Columns *g* and *h* are sufficiently self-explanatory.

The rapidity of the action of pepsin does not bear a uniform ratio to the increase of temperature up to certain limits; the same is true in regard to acidity. About the most satisfactory degree of dilution for 10 Gm. of albumen is 100 Cc.

There is practically no difference in the digestibility of egg albumen which has been kept in boiling water from five to sixty minutes.

The table illustrates the fact that no uniformity prevails in the various countries relative to the assay of pepsin, and the various schemes adopted are purely arbitrary, without any reference to the theoretical or real activity of the gastric juice. It is surprising, too, how crude some of the foreign pharmacopœial tests are, when we consider the number of able chemists those countries can produce. But, I presume, they may claim that any test arbitrary or otherwise which will show a uniform comparative value regardless of absolute energy is just as good from a commercial standpoint as one based upon experimental scientific facts. I do not think, however, that it is a safe principle to adopt, because it furnishes a precedent for similar careless methods of standardizing more energetic chemical and pharmaceutical products. The claim that the same dose of pepsin, whether it assays 1-1000 or 1-10000, is usually administered, is a lame excuse. It is, therefore, rational to govern the dose according to the activity. If the dose of a 1-1000 pepsin is 10 grains, the dose of 1-10000 pepsin should be 1 grain. Pepsin, like other unorganized ferments, is capable of a definite amount of absolute energy, and there is no reason why the dose should not be adjusted according to its digestive strength. We, like the physician, should consult the well-being and economy of our customers, the patient or consumer, as well as the trade features of the subject.

MINUTES  
OF THE  
SECTION ON PHARMACEUTICAL  
EDUCATION AND LEGISLATION.

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FIRST SESSION.—SATURDAY, AUGUST 15TH, 1896.

The Chairman, Prof. C. S. N. Hallberg, called the meeting to order at 3 o'clock p. m., and stated that in view of the possibility that the Chairman's address would be referred to a committee he would, with the consent of the members present appoint a provisional committee in advance, consisting of Messrs. Sheppard, Husted and Bartley, so that these gentlemen might pay critical attention to the subject matter.

Dr. H. M. Whelpley having been called to the chair, Mr. Hallberg proceeded to deliver the following address :

*Fellow Members :* During the eight years that this Section has been in existence, considerable work has been done in collecting facts concerning the closely related subjects of education and legislation. Only during the last few years, however, has any systematic method been followed whereby the various leading features of these important subjects have been epitomized and classified, and thereby made available for comparative study. It may be easily conceded that so far the deliberations of this Section have been productive of few results, but when we take into consideration the vast importance of the interests concerned, any appreciable advance in the preliminary work of classification and systematization must nevertheless be regarded as a substantial gain in the direction of our eventually obtaining a more specific knowledge of these primary factors.

The first thing that impresses the pharmacal educator is the poor quality of the material that he secures out of which to form the pharmacist of the future. Without discussing the various economic conditions through which perhaps a poorer class of youths are drawn into pharmacy than was formerly the case, it is believed that the school education of the average pharmacy candidate is depreciating year by year. We are fully aware that a considerable element of candidates are enabled without any external aid to become registered as pharmacists by passing an examination; but even taking this portion into consideration, it is believed that the young persons seeking to qualify themselves as pharmacists do not possess, as a rule, the amount of primary education that is required for the prosecution of the various subjects of pharmacal science.

Recently, at a conference of public educators, the following subject was posted for dis-

cussion: "On the Relations of Primary Education to the Study of the Arts and Science," when the following letter was sent:

MR. F. H. HALL: In considering the scope of public school instruction, perhaps by no safer standard can it be determined than that required for the future study to fit a young man or woman for the ordinary technical vocations or semi-professional pursuits. The vocation of the pharmacist, it is believed, is one of the very best means whereby to measure the school acquirements of the young preparatory to entrance into active life with its incessant study, constant observation and application which never ends with those who desire to keep abreast of the progress of science and to master their calling, art or profession. There is no other profession which draws upon so many of the sciences—the natural sciences, Botany, Zoölogy, Mineralogy, Physics and Chemistry.

Those that enter pharmacy usually do so at 14 to 16 years of age, as a rule, when they are eligible for entrance in High Schools. Is it too much to expect that at this age a young man should have acquired at least a solid foundation in the ordinary branches; that he should be able to write a fairly legible hand, to spell correctly, and to have a general knowledge of History and Geography?

The very first study that he must take up is the metric system of weights and measures and specific gravity. Is it too much to require that he should understand decimals and proportions, when he begins the study of Chemistry? Permit me, from an extended experience of over ten years as a teacher in pharmacy, to state that the majority of young men when they begin these studies do not appear to know any thing, or at least to be able to make any practical application of their school studies.

When a young man at the age of 18, say, begins study for some technical pursuit, he should be able to do so without being handicapped by his ignorance of such knowledge as is required in the study of any department or branch of science. In the fulfillment of this reasonable requirement the public schools of this state as well as most of the central and western states have proved a flat failure. In addition to my position as a teacher of pharmacy in the Chicago College of Pharmacy, I have conducted since 1885 a system of home-study in all the branches of pharmaceutical science, and during these years have had the opportunity to observe the school acquirements of nearly 10,000 young men and women from all the states of the Union. Of this great number barely ten per cent. could be considered as having acquired a thorough primary education. I have also found that those from the New England States, and especially from Massachusetts, have far better schooling than those from other states. There are several large cities in the Middle States from which we have had many students who in most instances could not write legibly or spell correctly. I will mention a few in order that this statement may possibly be corroborated: Illinois: Peoria, Springfield; Iowa: Des Moines, Sioux City; Ohio: Dayton, Cincinnati; Pennsylvania: Pittsburgh.

I should have stated that according to my experience the schools of Michigan are excellent, as those of Kansas are a disgrace. Along with other untoward influences you may find one of the chief causes for this condition in the Report of the Bureau of Education. "The standing of the schools as judged by their results appear to be influenced by the proportionate number of female teachers employed." Since a law was enacted by the last Illinois General Assembly prescribing an educational requirement for those who in the future desire to enter pharmacy, and also in view of the fact that the State Board of Health has formulated a minimum standard of scholastic education as a requirement for the study of medicine, would it be too much to expect that young men and women who leave the public schools of the state for the study of the sciences should be thoroughly grounded in at least the fundamental principles of education?

C. S. N. HALLBERG.

To which the following reply was received:

WAUKEGAN, ILL., Dec. 2, 1895.

PROF. CARL S. N. HALLBERG, 358 Dearborn Street, Chicago:

Dear Sir.—Your communication was duly received and read with much interest. It ought to be presented to the public eye, but I could find no place for it on our program at Elgin. Indeed, we were obliged to omit much matter that was received earlier than yours and that like yours bore directly upon the general subject.

The people as a whole are ignorant of the facts in regard to the quality of the work in the "common English branches," done in our schools. It is not generally believed that a large part of our pupils on completing the 8th grade work are unable to spell correctly or express their thoughts in approximately correct English. I do not think better work in the schools was ever done than now. We have much with which to contend in the way of home environment. But the strength of the teachers in the grades should now be exerted in an effort to do better work in the fundamentals. This is the weak point, and here we should mass our forces.

I wish your paper might find its way into print. Your experience and observation have been large, and the public should have the benefit of what you have thus gained.

I wish you would write me a few lines that I may use wherever I choose upon what you have observed in the matter of spelling.

Yours truly,

F. H. HALL,

Superintendent of High School, Waukegan, Ill.



The average pharmacy candidate begins when eligible for the High School, an institution which but few enter. Recent observation shows that the proportion of young men who enter High School is gradually decreasing. In Chicago, the number of men graduated from the High School was only 16 per cent; from the Grammar Schools, 35 per cent. If this proportion should hold good throughout the States, or at least through the larger cities, it may account for the comparatively low grade of educational qualifications in candidates. It would also indicate a sociologic problem of profound and far-reaching effect.

This much is evident, that if the coming pharmacists are to be equal to the battle of the future, they must be far better equipped than we have been. To sink below the grade will result in a class of men who will be driven from the field to seek more purely commercial vocations.

The resolution of this Association (1894) concerning preliminary education has been approved by the Louisiana and Maryland Pharmaceutical Associations, acted upon by the Arkansas, Illinois, Michigan and Virginia Pharmacy Boards, and the California College of Pharmacy. As yet the plan of preliminary requirement has been in force too short a time to effect any result, but it cannot help but be of great benefit eventually. This Association owes it to itself, to the future of pharmacy, and to the many young men who enter pharmacy utterly unfit and unprepared, to sound a clarion note of warning and to call upon every pharmaceutical association to consider this vital question. Experience has proven that to confine such requirement to college entrance is simply a vain attempt, and can only be enforced in institutions entirely independent of students' numerical support. Besides, it would be a gross injustice to deny many persons already engaged in pharmacy the advantage afforded by systematic instruction, even if not able to receive full benefit from such a course.

During the year, the following state associations have considered the establishment of pharmacy schools in their respective State Universities: Alabama, Colorado, Maine, Nebraska and Vermont. The Chicago College of Pharmacy, organized and incorporated in 1859, and since conducted by a voluntary association of pharmacists, was last June turned over to the Board of Regents of the University of Illinois, to be maintained in Chicago as a department of the State University. It has adopted the degree Ph. C. for award to successful candidates who lack the four years' experience still required for the award of the degree of Ph. G.

The School of Pharmacy of the University of Michigan has adopted the following degree: Bachelor in Pharmacy for the four year course.

The Philadelphia College of Pharmacy has adopted the following degrees: a 3-year course, laboratory obligatory, P. D.; a 3-year course no experience required, P. C., but laboratory obligatory.

The Cleveland School of Pharmacy has established a regular course and awards the degree.

This multiplication of degrees and variation in their significance has brought about much confusion. This was foreseen by the officers of this Section during the last two years, and for that reason an attempt was made to classify the degrees so that they would be uniform. Several drug journals and a number of writers, some without having any acquaintance with college degrees at the institutions that award them, have endeavored to make light of this movement, and in fact ridiculed our efforts. They will, in a very short time, see the necessity for such a scheme. A degree ought to mean something; it is only when the value is questioned that the degree appears as cheap as the institution that grants it.

Without desiring to re-open the question, we insist that a distinction should be made between the graduates with practical experience and those without it; that the degree of Ph. C. should be confined to the latter class, and that of Ph. G. should designate one

who has graduated in theory in pharmacy, as well as in practice, that is, from the store.

In view of the confusion that the variation in degrees has created, the Louisiana Pharmacy Board has decided to refuse the recognition of diplomas of Pharmacy Colleges. The Tennessee Druggists' Association adopted a resolution condemning the practice of Pharmacy Schools abolishing the practical experience requirement. The State Associations of Illinois, Missouri and North Dakota have passed resolutions requesting the institutions of the United States teaching pharmacy to recognize and maintain the established significance of the title "Ph. G." by demanding of all candidates for the degree satisfactory evidence of having served four years' apprenticeship in retail drug stores, under the direction of registered pharmacists. The Ohio Pharmaceutical Association adopted a series of requirements for the admission, instruction and graduation of students in schools in that State. They are substantially those approved by this Section last year.

The Buffalo College of Pharmacy has decided to abolish the practical requirement and has issued a manifesto as an excuse for its decision. The ninth paragraph of this pronouncement states: "At the Denver meeting of the American Pharmaceutical Association it was decided by a majority vote that drug store experience should not be made a requirement for graduation." Those present at the Denver meeting and readers of the report of the Proceedings (See Vol. 43, p. 375,) are no doubt in possession of the facts.

In reply to an inquiry as to the opinion of educators on the desirability of the experience requirement, a communication was received from the Hon. W. T. Harris, Commissioner of Education, Department of the Interior, Washington, D. C., agreeing with the opinion that practical experience in a drug store is an essential requirement for the proper theoretical study of and acquirement of thorough practical knowledge of pharmacy.

#### LEGISLATION.

This year sees but one important state, Indiana, and portions of Maryland, without a pharmacy law. The provisions of the laws now in force have been tabulated by the secretary of this Section, and will prove to be of great value for reference and comparison. Only by such comparative study can the defective points in our laws be disclosed. These will be found to be in the exemptions as applied to patent or proprietary medicines, the sale by wholesalers, and dispensing by physicians. Of these exemptions the sale of patents could be restricted to pharmacists whenever legislation can be secured that would require state or national supervision or regulation of the composition of proprietary medicines. To restrict the sale of proprietary medicines to pharmacists without a corresponding responsibility as to their composition, uses and effects, would not be in accord with the principles upon which pharmaceutical legislation is based.

Recent events in the alleged innocent dispensing of chemicals by retailers under wrong labeling on the part of wholesalers would possibly suggest that some modification be made in wholesale exemption. Two instances in Illinois where morphine has been dispensed for quinine, and one in Montreal where tartar emetic was dispensed for bismuth subnitrate, indicate the danger to pharmacists in relying solely on the label without examination of contents on their own account. As to physicians dispensing, this is a long subject. The pharmacist must make concessions to the physician if he desires to retain this privilege. He should not refill prescriptions or give a copy except by the direction of the prescriber. We hold against successful contradiction that the prescription belongs to the author jointly with the pharmacist, who has the right to keep it as a matter for reference in case of error. The patient for whom the prescription has been written has no right in it whatever after it has been filled. From a professional standpoint the physician has no more right to dispense, than has the pharmacist to prescribe. The two functions should be separated. To accord to any one person, in addition to the privilege of diagnosing the disease, prescribing the remedy and signing the death certificate, also the right to dispense the medicine, is concentrating too much responsibility in the

hands of any one individual, who but human may err, and affords no protection to the public. Recently it has been reported in the press that a physician after tasting a proprietary medicine which he had dispensed for a patient had died from its effects. It is a serious question, and upon the separation of the two functions of prescribing and dispensing rests, it is believed, in a large measure the future of pharmacy.

The registration of pharmacists should be annual, in order that the registry of pharmacists may be true and complete, and that the Boards may have sufficient funds for the enforcement of the law.

Many laws are defective in this respect, especially the laws of Kentucky, New York, Ohio, Tennessee and Texas. Examination fees should never be refunded. The present arrangement is a great inducement for young and unqualified candidates to try the examinations.

The inter-recognition of registration certificates has not gained much headway, although it is advocated by a number of Boards. It is suggested that some degree of uniformity in the requirements of the laws and in the examinations be first secured before a general interchange be either desirable or practicable. The Boards should have the power to refuse examination to candidates who have no reasonable educational qualifications.

Employers or principals should take more interest in the methods for qualification pursued by their employees or apprentices. How can it be expected that young, inexperienced persons should know anything of the best plan of study? The average young man does not understand what pharmacy is, or its requirements, until he realizes after a few years' service that he must become registered. Usually he selects a date two or three months ahead, when the Board has a meeting for examination of candidates, and begins a more or less systematic course of study. If he be bright, he may by the use of Quiz Compendes and a comparison of examination questions, succeed in passing; if the contrary, he may fail. In the first instance the candidate, his principal and the profession of pharmacy will all be seriously affected. The man that failed, unless properly directed in his studies, will continue in his incoherent course until he either practices on the Boards and eventually succeeds in passing, or in disgust takes up some other vocation.

It should be the privilege, as well as the professional duty, of every principal to direct the efforts of his employees or apprentices in a proper course of systematic study. There is no lack of such courses.

In conclusion, it is recommended that the subject of preliminary education be presented by the Committee of this Section to the various State Pharmaceutical Associations for consideration and report to this Section at next year's meeting.

On motion of Mr. Watson, the address was referred to the committee of three already named, with the request to report at the next session.

The Chairman having called for Reports of Committees announced that as chairman of the committee to whom last year the article on Scholarships, by Prof. Sayre, was referred, he desired to state that the committee unanimously desired to extend this question to some future time.

The Committee on Registration of the sale of poisons stated that their report which was not completed at the close of the last annual meeting had been sent to the Permanent Secretary and published in the volume of Proceedings for 1895.

The Secretary, Mr. J. H. Beal, read his Report on Legislation and Registration Statistics, which on motion of Mr. Good was received, accepted and referred to the Publication Committee.

# SECRETARY'S REPORT ON LEGISLATION AND REGISTRATION FOR OFFICIAL YEAR 1895-6.

During the past year the Secretary of this Section has endeavored to collect statistics concerning the following classes of facts:

(1) The total number of Registered Pharmacists and Assistant Pharmacists in the United States at the close of the last official year.

(2) The total number of applicants for registration during the same time and the ratio of successful to unsuccessful candidates.

(3) The total number of pharmacists and assistants registered during the year, and of these the relative number registered by examination, on diplomas, on licenses of other boards, and on experience.

(4) The character of new legislation obtained or attempted.

As will be seen from the table subjoined, the attempt has been only moderately successful. This is accounted for, partly for the reason that until recently many of the boards have not been keeping records of all the facts asked for, and hence are unable to furnish the information desired. The chief difficulty, however, has been to get replies from some of the secretaries. Of the 40 boards in the United States the secretaries of about 20 to 25 reply to all questions, carefully and promptly. About 10 more will reply, but with some delay. The remainder fall into three classes; those who reply after repeated urging, those who rarely respond to any communication, and those who never respond at all. There is one board from which the writer, after an effort of two years, has never been able to elicit any response whatever, not so much as a printed copy of the law, or even an acknowledgment of the receipt of the postage stamps sent for reply.

Some of the boards are quite averse to giving out copies of the pharmacy laws. In several instances the only way the writer has been able to procure such was by employing an attorney or other person residing in the state to have a typewritten copy made.

It is perhaps safe to say that from 15 to 20 per cent. of the boards perform the duties of their office in a rather desultory and perfunctory manner, and a few of them so poorly as scarcely to merit even this degree of commendation. The remaining boards are mostly composed of men who are both competent and enthusiastic in their work, and bestow upon it a large amount, both of labor and of patience, for which they are generally very poorly paid.

During the work of the past two years in this Section, the writer has been very strongly impressed by the following facts, namely, that where the state association has a large and enthusiastic membership, there is almost invariably an efficient and enthusiastic pharmacy board, and a law well administered, and, conversely, where there is no state association, or where the one in existence is in that peculiar condition known as the "dead and alive" state, there, with but few exceptions, the law is weakly enforced or not at all. There are one or two states where the board, in spite of a want of proper support, does its duty conscientiously, but these are exceptions. After a careful survey of the entire field, the writer inclines to the opinion that a state is nearly as well off without a pharmacy law as with one, unless there is also a good strong association to support it; for a law poorly administered only operates as a burden to the conscientious druggist, without restraining the dishonest or incompetent one.

No reports were received from the following boards: Idaho, Louisiana, Erie County, N. Y., Texas and Wyoming.

The answers received to No. 2 named above were so incomplete and unsatisfactory that it was thought best not to encumber the table with them. In all cases where numbers are estimated the fact is stated. Numbers not so marked were compiled from reports.

The following is a summary of the statistics which are given in the table in detail.

TOTAL REGISTERED PHARMACISTS IN UNITED STATES AT THE CLOSE  
OF LAST OFFICIAL YEAR.

Compiled from reports.....	55,979
Estimated, additional.....	2,150
Total .....	58,129

TOTAL REGISTERED ASSISTANTS IN UNITED STATES AT THE CLOSE  
OF LAST OFFICIAL YEAR.

Compiled from reports .....	9,969
Estimated, additional.....	300
Total .....	10,269
Total Registered Pharmacists and Assistants .....	68,398

The above figures are no doubt in excess of the real numbers, since in states where renewal of registration is not practiced no mean exists of determining the number of licentiates who have died or withdrawn from business.

## PHARMACISTS REGISTERED DURING LAST OFFICIAL YEAR.

By Examination .....	1,994
On Pharmacy Diploma .....	566
On Medical Diploma.....	380
On Licenses of Other Boards.....	244
On Experience .....	654
Total .....	3,838
Estimated, additional.....	300
Total .....	4,138

## ASSISTANTS REGISTERED DURING LAST OFFICIAL YEAR.

By Examination.....	948
On Experience .....	108
Total.....	1,056
Estimated, additional.....	100
Total.....	1,156

## COMPARISON WITH LAST YEAR.

By the report of the Secretary of this Section at the last meeting there were registered the year preceding:

Registered Pharmacists .....	3,521
Report for this year .....	4,138

Showing a gain in the number of registered pharmacists registered the past year of 617.

The number of Assistants reported last year was.....	860
Reported as registered the past year.....	1,156

Showing an increase in registration for the year of 296.

In looking over the table one is struck with the great disparity between the number registered each year as assistants and as pharmacists, the former not amounting to much more than 25 per cent. of the latter. This is partly accounted for by the fact that many

States do not recognize the assistant's grade. But where it is recognized, is it not a mistake to permit so many to register for the higher grade at once? Would it not be better if every licentiate was required to first register as an assistant, before being admitted to the examination for pharmacist's license? Is there not at the present time too great an effort on the part of young men to become registered pharmacists in the shortest possible time, and would it not be better for all parties, the public included, if they were encouraged to serve a little longer in their apprenticeship? This could largely be brought about by raising the standard of examinations for pharmacist's papers, and when any candidate fell below the standard, but showed proficiency enough to justify assistant's papers, to give him the option of taking the latter or being marked as "failed." There are but few who would not choose the first alternative, with the result not only of materially lengthening the term of apprenticeship, but of increasing the revenues of many a financially embarrassed board.

#### LEGISLATION FOR 1895-6.

28 states report no legislation attempted during the past year. 12 states report new legislation attempted, but in only five cases were the efforts enacted into law, one being the so-called Raines liquor law of New York, and another reopening registration to those eligible at the passage of the original act, one in Iowa prohibiting the sale of malt liquor by druggists, an act permitting physicians to practice pharmacy in Mississippi without registration, and the codification of the pharmacy laws in Massachusetts. Announcements of other new laws have appeared in the journals from time to time, but it was thought best to follow the statements of the various secretaries in making out the report.

#### PHARMACY LEGISLATION FOR 1895-6.

*Florida*: Bill to amend Pharmacy Law. Did not come up for second reading.

*Iowa*: Bill to permit physicians to register as pharmacists without examination. Defeated. A law was passed prohibiting the handling of malt liquors by druggists.

*Kansas*: Bill to amend poison schedule, adding penalty for false statements in registration, adding fee for renewal of registration, amending section relating to sale of domestic remedies by general dealers, equalizing fees for examination and registration. Defeated.

*Kentucky*: Bill to extend pharmacy law to entire state, and changes in regard to fees. Defeated.

*Maryland*: Bill to extend pharmacy law to entire state. Defeated by opposition of country merchants.

*Massachusetts*: Pharmacy laws codified, and brought together under one act. Minor points only changed.

*Mississippi*: Bill to permit physicians to practice pharmacy without examination. Passed.

*New Jersey*: Bill introduced to amend pharmacy law, but withdrawn.

*New York*: Raines law passed, requiring druggists and all others to take out license to deal in alcoholic liquors. Also one reopening registration for persons eligible at original passage of the law.

*New Mexico*: Bill for financial relief of board. Failed to pass.

*Ohio*: Bill to amend pharmacy law by bringing sale of poisons and domestic remedies by general merchants under control of pharmacy board, charging fees for registration, etc. Defeated. Also bills to tax druggists for sale of tobacco and cigars, and for sale of liquors. Defeated.

*Rhode Island*: Bill to amend pharmacy law by making board to be composed of pharmacists, instead of physicians and pharmacists, as at present. Defeated through opposition of physicians.

*Utah*: Bill to amend law regarding sale of drugs by unregistered persons, renewals of registration, etc. Defeated.

*Virginia*: Some private bills introduced, but defeated.

## REGISTRATION STATISTICS TO CLOSE OF 1895.

State, County, Territory or District.	Total Registered at close of 1895.		Registered during 1895.								Total Regis- tered in 1895.	
			By Ex- amina- tion.	R. P.'s. On License or Diploma.			On Ex- peri- ence.					
				License of An- other Board.	Pharmacy Diploma.	Medical Diploma.						
	R. P.'s.	A. P.'s.	R. P.'s.				A. P.'s.	License of An- other Board.	Pharmacy Diploma.	Medical Diploma.	R. P.'s.	A. P.'s.
Alabama .....	709	....	10	....	....	2	8	....	....	20	....	41
Arkansas .....	884	....	17	....	2	8	....	....	....	27	....	
California .....	1596	796	43	41	6	48	....	....	....	97	....	
Colorado .....	560	37	52	15	....	....	....	....	....	67	....	
Connecticut .....	733	....	45	....	5	18	....	....	....	68	....	8
Delaware .....	229	185	2	....	....	5	2	....	8	9	....	
District of Columbia .....	667	....	16	....	....	17	....	....	....	33	....	
Florida .....	585	....	13	....	....	6	13	....	....	32	....	
Georgia .....	989	....	41	....	7	....	8	....	....	56	....	272
Idaho .....	....	....	....	....	....	....	....	....	....	....	....	
Illinois .....	4513	1275	110	206	....	....	....	82	66	192	....	
Iowa .....	2252	21	157	15	....	7	....	....	....	164	....	
Kansas .....	1410	77	57	24	....	24	....	....	....	81	....	24
Kentucky .....	838	....	33	....	....	15	3	....	....	51	....	
Louisiana .....	....	....	....	....	....	....	....	....	....	....	....	
Maine .....	626	20	11	4	....	....	....	....	....	11	....	
Maryland, Baltimore .....	451	74	21	....	....	38	....	....	....	59	....	64
Massachusetts .....	3690?	....	87	....	....	....	....	....	....	87	....	
Michigan .....	3116	335	96	64	3	....	....	....	....	99	....	
Minnesota .....	1200	200	58	66	7	4	8	....	....	77	....	
Mississippi .....	926	....	12	....	....	....	....	....	....	12	....	469
Missouri .....	1291?	....	78	....	7	90?	294?	....	....	....	....	
Montana .....	220	13	6	....	....	....	....	....	....	6	....	
Nebraska .....	1479	....	33	....	....	....	....	....	....	33	....	
New Hampshire .....	568	283	17	10	....	....	....	....	....	17	....	10
New Jersey .....	1300	....	22	5	7	18	....	....	....	47	....	
New Mexico .....	151	....	2	....	8	7	....	....	....	17	....	
New York State .....	4940	197	177	21	....	....	....	85	....	262	....	
New York City .....	3338	2170	26	....	102	141	31	....	....	300	....	11
New York, Brooklyn .....	680	10	76	11	53	71	3	....	....	203	....	
New York, Buffalo .....	....	....	....	....	....	....	....	....	....	....	....	
North Carolina .....	339	141	27	....	....	3	10	....	....	40	....	
North Dakota .....	238	77	15	....	7	6	....	....	34	28	....	34
Ohio .....	3058	658	132	97	....	....	....	....	....	132	....	
Oklahoma .....	150	2	28	1	2	1	....	....	....	31	....	
Oregon .....	636	58	43	....	....	....	....	....	....	43	....	
Pennsylvania .....	6085	2663	213	184	....	....	....	....	....	213	....	184
Rhode Island .....	209	148	4	24	....	2	....	....	....	6	....	
South Carolina .....	109	....	1	....	....	....	....	....	....	1	....	
South Dakota .....	481	18	28	7	....	....	....	....	....	28	....	
Tennessee .....	850	90	17	8	....	....	....	....	....	17	....	8
Texas .....	....	....	....	....	....	....	....	....	....	....	....	
Utah .....	204	18	10	5	....	26	....	100	....	136	....	
Vermont .....	402	....	15	....	....	....	....	387	....	15	....	
Virginia .....	804	38	21	24	....	....	....	....	....	21	....	24
Washington .....	501	63	11	15	11	3	....	....	....	25	....	
West Virginia .....	672	....	37	....	....	6	....	....	....	42	....	
Wisconsin .....	1300	302	74	101	17	....	....	....	....	91	....	
Wyoming .....	....	....	....	....	....	....	....	....	....	....	....	....
Totals .....	55979	9969	1994	948	244	566	380	654	108	3838	1056	....

The nomination of officers for the ensuing year being the next business in order, Mr. Alpers nominated Jas. H. Beal for chairman; Mr. Watson nominated the present chairman, Mr. Hallberg, to succeed himself. Both gentlemen were also placed in nomination for secretary.

The Chairman having directed the reading of papers as next in order, the following was read by the author, Mr. H. B. Mason, of Dannemora, N. Y.

#### CONCERNING THE CHARACTER OF STATE BOARD OF PHARMACY EXAMINATIONS.

BY HARRY B. MASON.

It shall be my purpose herein to declare, first, that nearly all of the examinations held by State Boards of Pharmacy are of such character that the "quiz-compend" student is the one most successful in passing them; second, that the "quiz-compend" student is not the competent pharmacist; and third, that, therefore, to perform the high duty expected of them, the examinations must be changed in character, until only the competent pharmacist will be successful. Concerning this necessary change in character, I hope also to offer a few suggestions.

We all know the "quiz-compend" student. He needs no introduction. He it is who crams down isolated facts just previous to an examination. He does this by memorizing the word-formulas of the "quiz-compend." To change these formulas often ruins his information. This is the class type; but there are several varieties. One may be found in college—he who swallows facts and principles, much as a savage swallows an apple, with no attempt at mastication, and certainly with no effect of digestion. Another, not of the college, but somewhat higher than the class type, consults a wider library than the "quiz-compend." The Pharmacopœia, Dispensatory and other reference books may be resorted to, in the use of which he is guided by what he thinks the Board is likely to ask him. If possible, he gets a used set of questions and confines his preparation solely to looking up answers to these questions and others of like import which occur to him. His whole study is prosecuted that he may pass the Board. In this study, if indeed it is study at all, no faculty other than the memory is brought into use, and the information he gains is not assimilated, if understood, and is quickly forgotten after its use before the Board is past.

That most of the examinations are best adapted to the success of this student can hardly be denied. With but few exceptions, questions like these recently given form the character of the examinations:

"Name two salts containing a large proportion of water of crystallization, and state the percentage of water in each."

"What is the origin of Copaiba? Lobelia? Senna?"

"Define Cerates."

"Give a list of the official fixed oils. Why so called?"

"Name the different processes for making official tinctures."



"What is an acid? A base? A salt?"

"What are the ingredients in Linimentum Saponis?"

How many of these questions could not the "quiz-compend" student answer? How many that require other than stereotyped answers of isolated facts without proof that these facts are understood and are usable? How many are there that determine a pharmacist's real competency?—more than that, how many which do not demand the competent pharmacist to "cram," in order that he may be successful in answering them?

The second proposition, that the "quiz-compend" student is not the competent pharmacist, no one will refute. He who knows but isolated facts is like the child who knows the spelling of a few words, but has no knowledge of the alphabet. The basic, alphabetic letters from which words are formed must be known before those words can be understood in their relation, use and value. Likewise must the basic principles which underlie and control facts be known before the relation, use, and value of those facts can be understood. And this understanding of the relation and value of facts is positively necessary if they are to be used, just as is necessary a knowledge of the relation of words if they are to be combined into intelligible sentences. If facts are to be of any value to their possessor, three things are necessary to their acquirement. First, knowledge of the science or sciences to which they are related, and by which they are in part governed, that they may thoroughly be understood; second, reflection upon and handling of them, that they may be digested and assimilated by the mind; and third, practical experience in their use, which confers their real value and gives facility to their adaptation. That which is of the mind, that really belongs to it and forms of it a part, the mind can direct to necessity. But it has no power over surface information, a heterogeneous mixture of unclassified and unrelated facts not understood, which must leave their habitation uninfluenced, as oil is decanted from the water on which it floats, unaffected by it.

Assimilated knowledge implies as well a strengthening of faculty, which together with the knowledge itself, fits one for any exigency. Much of the pharmacist's work is speculative and theoretical in character. He is very often called upon to supply within himself, unaided by book reference or specific knowledge, the means for the satisfaction of some exigency. To supply these means, his knowledge must be in the highest degree usable; he must know his pharmacy as he does his alphabet, so that any combination of facts and principles may be formed and used. The watchmaker who does not know the principles which govern the parts of a watch, the relation of these parts one to another, and their use alone and in combination, can hardly be expected to improvise a satisfactory whole which would fulfill the peculiar office expected of it.

It is this use of himself, then, rather than his show of knowledge of single facts or principles, that the Board should seek to discover, and make

the primary requisite to success. There is always the objection to asking single facts that the pharmacist may be asked those things he may never use in his practice, and though once learned, have forgotten. Something more and different should be required of him. Single facts—*i. e.*, formulas, synonyms, definitions, origins, etc.,—it is the office of reference books to furnish. But imagine a book devolving into a working pharmacist! Books are useless unless their necessary parts are selected, combined, and adapted, and then directed to necessity. To do this, is the office of the pharmacist. He needs to supplement the book, not to duplicate it. It should be seen how he brings his individually reduced stock of knowledge to bear upon the book, and uses it as a means towards end; and in those cases where the use of books is precluded, how he supplies the means from within himself. If the applicant be found efficient in this, he is capable of learning those things of memory as he needs them, and will then remember them and be safe in their use.

In illustration of this point, pardon me for relating one of the many instances which have come to my notice. Some years ago my college roommate went into another State to practice, and as a preliminary, went, of course, before the Board—one of the most active and supposedly best of our Boards. He passed commendably the written examination and identification of specimens. Nothing remained but the oral examination. Here he was likewise successful, until in an unlucky moment he was asked a few synonyms and unused, obsolete Latin prescription terms. Herein he exhibited deficient knowledge. Dropping all else, the examiners plied him in these things. This one deficiency signalized his defeat. He was “plucked.”

My friend had practiced pharmacy where synonyms were rarely used, and where the physicians resorted not to extensive Latin signs. He had memorized them during his general study, but those things which do not appeal to the reasoning faculties or are not associated in the mind, he had difficulty in remembering. After his defeat, he went home and studied synonyms and obsolete Latin abbreviations, and a month or two later again went before the Board. This time he was successful.

I ask in all fairness and equity, was this right? Do not understand me to imply that a pharmacist need not know synonyms, or other species of memorized facts, if he have use for them. But if he have not, will he not quickly forget them? Do they at all determine fitness? And though they should form a part of the examination, should they be made the difference between success and failure? If so, then it is the “quiz-compend” student, the “crammer,” who will be successful. When first my friend went before the Board he was not enough of a “quiz compend” student. Realizing the deficiency, for a month he crammed down the facts he knew the Board required of him, until he suffered from the pangs of mental indigestion. But he supplied the deficiency, and his reward was meted out to him.

An examination that compels an applicant to have a spécial fitness for it, a fitness quite distinct from that required in pharmaceutical practice, is perverted in character. And yet, one of our most progressive Boards makes its boast that applicants have to learn how to pass its examinations. If a competent pharmacist months previous to an examination must pack himself, in deference to the unreasonable "hobbies" of the Board, with isolated facts and peculiar, unused bits of information which do not at all determine his fitness, the very end for which the Board exists is being prostituted. Not only is the competent pharmacist subjected to gross injustice, and his real efficacy not determined, but the incompetent "quiz-compend" student is given his only possible chance of success. The latter's business it is to fill himself with facts he does not understand, but which he knows the Board will require of him, and then to forget them during the six months following his exhibition of them.

The Board should seek to determine the applicant's every day, year in and year out, fitness; for this is what his constituency, the public, is treated with, and it is his usefulness herein that is the measure of his value. His normal condition, in brief, is what the Board should seek. A man is not in his normal condition after gorging himself at a turkey dinner; nor does his increased weight represent increased strength, though some Boards act on the figurative principle that this gorged man, perhaps unable to get out of his chair, is the best worker. They make an applicant stuff himself until he can't eat more, and then they weigh him. If found light, and active, and sinewy—in a working condition—he is regarded wanting, and told to go back and eat more next time, and then come and get weighed again.

To some of the Boards has come a realization of something wrong in this method. The "crammer" somehow lacked usefulness in practice. This was thought due to deficient early schooling, and so "preliminary education" as a registration requirement is much talked of as a necessity. This education is primarily of use in disciplining the mind, in developing settled habits of thought, and in creating a capacity to think and to reason, to create and to formulate. It is next of value, because through this developed mentality and the knowledge he has acquired, the student is capable of understandingly studying the sciences which underlie the comprehension of pharmacy. Now, while the making of preliminary education a registration requirement is a step toward higher education and greater usefulness, and is not by any means to be decried—instead, sanctioned—yet in a sense it is not the Board's place to accept any one's word for the competency of an applicant. Its examination should be of a character to demand the use of those qualities which a preliminary education gives to one, and which are positively necessary to competent pharmaceutical practice.

It becomes pertinent here to discuss more in detail the character of an

examination that will demand the requisites of competent pharmaceutical practice. As has already been brought out, there are two very serious objections to asking single or isolated facts: First, their possession does not insure fitness; and second, those may be asked which the applicant has forgotten through lack of need. In the first instance, the applicant, though successful, has not been proved competent; and, in the second, though he fail, he has not been proved incompetent. By the first horn, the "crammer" is tossed into grace; by the second, the competent student is gored through the vitals. To obviate these objections, ask, first, the use of knowledge and of faculty, which does determine fitness, and second, instead of asking single facts, duplicate the exigencies of practice themselves (using, if you will, only those more ideal) for then only such knowledge will be required as is necessary to competent service. To this end, bring into prominence problems in percentage composition, in specific gravity, in alligation. Ask speculative questions of importance, as to what course would be followed in a given case. Duplicate ideal prescription-desk necessities. Ask few isolated facts, but demand their combination and use, as is necessary in practice, of which the Board should be representative. Instead, for instance, of asking the applicant the number of drops in a fluid drachm of laudanum, its dose, and percentage of opium contained, three separate questions of this "quiz-compend" order, make him combine and use this knowledge thus: "If you were called upon to prepare a four-ounce 'teaspoonful' mixture, of which laudanum was the main ingredient, how much laudanum would you use, and after preparing the mixture, how much opium would there be in the bottle?"

Some of these features are given inferior attention by some Boards; but little attention is attached to them. The underlying principle seems not to be understood, nor consideration given it. Instead, attention is directed to the subjects which the examination should encompass. I see not that it makes much difference what the subjects are if they are mishandled. Diamonds will go through a leaky pail as readily as will coins. It would appear wiser to first mend the pail through the holes of which the "quiz-compend" student slips with such surprising ease. To do this, only those questions should be asked which demand, not the use of an unaided memory, but of reasoning, creation and judgment, and the possession and use of assimilated knowledge.

But though the applicant successfully acquit himself along these lines, he has not yet proved his real competency. He may lack sufficient shop experience. Shop experience gives the student the true perspective of the field of knowledge; it shows him the real value of knowledge, and gives him facility in its use. It skills him in the application of means to end, in the carrying out of his mental calculation and improvisation, and builds up a knowledge of things experienced which will be invaluable in applying to things to be experienced. It gives him technical or operative skill that

he may handle the many implements of his profession with deftness and success. For these and other reasons, shop experience is a positive requirement to competency. No applicant should be granted registration until he has proved himself efficient in the practical work of the shop.

But it may be held that the applicant has already proved himself able to grapple with the problems of practice. Experience has again and again disproved this notion. Many students there are who are abundantly able to theorize, speculate, and improvise, who in mental calculation can ably adapt means to ends, but who, in practical work, confronted with the real instead of the imaginary necessity, fail most utterly. This weakness in application it is which sometimes makes of the best student the poorest pharmacist. And sometimes this man is the most dangerous; for, like steam that has no escape, his knowledge may do great harm.

And beside, an applicant should prove himself deft in the handling of the tools of his profession. Surround him, therefore, with the necessary appurtenances of his art, and then subject him to the same demands that are made of him in the prosecution of his regular duties. Give him pills and emulsions to make, assays to perform, and tests to apply, and that work to do in which success bespeaks practical fitness. Give him a prescription to put up, in the compounding of which special treatment, based upon a knowledge of the scientific factors involved, is necessary to obviate some likely trouble or to facilitate combination.

If an applicant is to be examined with intent to discover his real efficiency, neither of these divisions of this scheme of examination can be sacrificed. For, though the student may show himself possessed of the necessary knowledge, and of an ability to use it in mentally coping with an imaginary necessity, when placed in the shop he may be, and often is, found inefficient, either, it may be, in applying knowledge to practical ends, or in the technical operations of his art. And, on the other hand, though shop experience has given an applicant operative deftness and skill, he may be ungrounded in the fundamentalities of his profession; his knowledge may be inadequate and unassimilated; there may be lacking an ability to cope with the mental problems which daily come up in his practice, and therefore, inefficiency, if not danger, may lurk in his every action. A really competent pharmacist will have no trouble in acquitting himself in both divisions—less trouble, in fact, than he has in the examination which demands of him special “quiz-compend” qualifications that do not test his fitness; the examination which, like the two-edged sword that cuts both ways, allows the “quiz compend” incompetent to slip by gracefully.

*Dannemora, N. Y., May 23, '96.*

On motion the paper of Mr. Mason was referred for publication, and Mr. Hallberg then read the following paper on Pharmacy Board Examinations, which was referred to the same committee.

## A COMPARATIVE EXHIBIT OF PHARMACY BOARD EXAMINATIONS.

BY C. S. N. HALLBERG.

Upon receipt of a paper entitled, "Concerning the Character of State Board of Pharmacy Examinations," the Committee on Education and Legislation decided to endeavor to make an investigation, and, if possible, to present a report to the Section on the status of Board examinations. A circular letter was drafted by the committee stating that a paper would be presented to the section criticising the character and methods of conducting the Board examinations, and a request that one or more sets of questions, together with a statement of all other examination requirements, oral, practical, identification, etc., be at once transmitted, and that from these this committee could formulate, if possible, an answer to the charge.

A copy of this letter was sent to the secretary of every state board of pharmacy, and nineteen responses were received up to the time required for their examination. In view of the lack of uniformity in the subjects for the examinations, great difficulty was experienced in arriving at a satisfactory measure of valuation or standard of rating.

Even the stated (written or printed) questions vary considerably. A set of 20 questions of three different boards rated 65, 80 and 100 respectively, while a set of ten questions from three other boards, rated 95, 100 and 105 respectively. The chairman wrestled with the questions for several days, and after having provisionally rated them five times, finally struck an average or unit of measure upon the following basis of minimum and maximum units: Does the official solution of Chloride of Iron contain ferrous or ferric salt, value 1. This question is rated at 1 because it requires but little thought, and is answered in one word. Simple translations of titles, names and synonyms were also considered a unit. From this there were all gradations up to questions involving an extended knowledge and much thought and time to write out a satisfactory answer, as illustrated in the following: "What are glucosides? Give symbol of glucose. What are resins? Name three. What are alkalies? Name three. What are synthetic compounds? Name the official Gums, Oleo-resins, Stearoptens, Gum-resins and Balsams." This question was divided into five subsidiary ones; it covers nearly one-fourth of theoretic pharmacy, and was given a value of 35. The value of specimens was based upon taking one specimen as a unit or 1.

Toxicology and Posology were often included with some other branch or with prescriptions.

Dispensing and compounding was rated at a minimum of 10 for each mixture. Prescription interpretation, unless presented as stated questions, was rated at 50, as this is the number of prescriptions required to be read in most cases. The most difficult part to rate was the Oral examination. As there was no way of discriminating, a uniform rating of 50 was given to each of the six examinations that include any oral or general examination. The subjoined table is the result of the comparison, after each member of the committee had passed thereon.

COMPARATIVE EXHIBIT OF EXAMINATIONS OF SOME PHARMACY BOARDS—1896.

SUBJECTS.	16	15	2	7	8	13	10	11	1	17	5	12	14	4	6	18	19	3	9
	Ark.	Cal.	Colo.	Conn.	Ga.	Ills.	Kans.	Mass.	Mich.	Minn.	Miss.	Neb.	N. Y.	N. C.	N. D.	Ore.	Tenn.	Va.	Wis.
Chemistry, <sup>1</sup> Questions .....	50	65	125	95	100	30	80	50	90	....	100	75	80	70	70	65	80	100	65
Specimens <sup>2</sup> .....	....	....	20	....	....	....	....	....	5	10	....	....	....	10	10	....	....	....	10
Botany, <sup>3</sup> Materia Medica, Questions .....	45	65	120	....	....	....	80	50	190	25	70	55	70	100	75	55	70	85	60
Specimens <sup>3</sup> .....	....	....	20	20	....	20	20	10	10	10	....	10	12	10	10	....	....	....	10
Toxicology, <sup>4</sup> Posology .....	40	65	....	....	50	....	....	....	....	....	100	60	60	....	....	75	....	....	....
Pharmacy, Questions .....	110	70	100	95	90	80	110	85	130	50	95	100	65	95	70	65	75	100	80
Specimens <sup>5</sup> .....	....	....	20	20	....	20	20	10	10	10	....	....	....	10	10	....	....	10	10
Dispensing, <sup>6</sup> Compounding .....	....	....	45	50	....	40	....	....	....	60	....	....	....	....	40	....	....	70	50
Prescription, <sup>6</sup> Interpretation .....	35	20	....	50	130	50	....	50	65	50	25	....	....	50	50	....	....	50	50
Oral, <sup>7</sup> General .....	....	....	....	50	....	50	....	50	....	50	....	....	....	50	50	....	....	....	....
Totals <sup>8</sup> .....	280	285	450	380	370	290	310	305	500	265	390	300	287	395	385	260	225	415	335
Percentage .....	56	57	90	76	74	58	62	61	100	53	78	60	57.4	79	77	52	45	83	67

<sup>1</sup> In some examinations all the subjects are comprised in one set of questions. Where practicable such have been separated for this exhibit. Minn. has no stated examinations in chemistry. <sup>2</sup> The ratings represent the number of specimens required in each subject. <sup>3</sup> Examination in materia medica based on specimens. Conn., Ga., Ills.

<sup>4</sup> Often included in prescription interpretation.

<sup>5</sup> Conn., Ill., Mass., Minn., N. C., N. D., Wis., rated 50.

<sup>6</sup> Conn., Wis., indefinite; Neb. in project.

<sup>7</sup> Indeterminate oral, rated at 50.

<sup>8</sup> Sometimes printed questions, also reading from files; Conn., Ill., N. C., N. D., Wis., rated 50.

<sup>9</sup> Percentage compared to Mich., 100.

The results of this comparison must of course be more or less tentative, but it is believed that they are on the whole not far out of the way. The indeterminable quantity is the oral part, which, however essential or desirable in an examination, should be only supplementary to the stated examination. It is believed that the stated questions should fairly cover the field in each of the three important branches; that identification of specimens should be required in each of the three branches; that practical work (the dispensing of from four to five mixtures) should be required. In all the large states there are plenty of facilities for this in the laboratories of the schools and colleges. The interpretation of prescriptions is essential, and this should be accompanied by oral examinations, the examiner endeavoring to find out whether or not the applicant has the practical experience and knowledge that will make him reliable and useful in the pharmacy.

Dr. Whelpley read the two following papers, touching also upon Pharmacy Board Examinations, which were, on motion of Mr. Sayre, received and referred to the Committee on Publication :

#### SUGGESTIONS FOR THE USE OF BOARD OF PHARMACY MEMBERS IN PREPARING AND CONDUCTING THEIR EXAMINATIONS.

BY H. M. WHELPLEY.

Since the appointment of Boards of Pharmacy in nearly all of the States and Territories, and the passage of laws requiring every prospective practitioner of pharmacy to pass an examination before one of the Boards, the importance of the examination has reached a point demanding serious consideration.

It is no doubt in the nature of events that some Board members are less competent than a few of the candidates they examine. But this should not deter them from endeavoring to qualify themselves as soon as possible, and to be guided by the proper general ideas in the preparation and execution of the examinations.

After carefully studying all available examination questions given by Boards of Pharmacy during the past two years, I am convinced that they average, too high in theory, and lack thoroughness in practical questions.

I hold that State Boards of Pharmacy are, by law, constituted for the examination of practicing, and would-be-practicing, pharmacists, their duty being to make inquiry in a way that will enable them to learn whether or not the applicant is a safe person to fill physicians' prescriptions and to sell drugs and chemicals across the counter. I claim that these boards are not constituted to inquire into the higher pharmaceutical education of the applicant.

#### THE PREPARATION OF THE EXAMINATION.

Keep constantly in view the fact that your duty is to test the candidate's competency as a safe retail druggist. Frame the questions in a



manner that will puzzle the Quiz Compend fiend, but make the competent pharmacist feel at ease.

Read carefully the preface to the United States Pharmacopœia, and follow its rules of nomenclature, etc. I find in many examinations such mistakes as chlorate of potassium, or chlorate of potash, for potassium chlorate.

Do not abbreviate pharmaceutical names unless done for the purpose of testing the candidate's knowledge of abbreviations. In such cases be sure you are right.

Avoid giving a partial answer to your own questions, as in the following : "Where is croton oil obtained, and from what part of the plant ?" The candidate might have supposed it came from the big-headed whale, if you had not told him otherwise.

Be careful about your Latin.

Do not confound the Pharmacopœia with the dispensatories by asking such questions as the following : "How is laudanum made according to the latest United States Dispensatory ?"

Avoid framing one question so that it is dependent on a correct answer to the previous one.

#### METHOD OF CONDUCTING THE EXAMINATION.

You can easily and unnecessarily flustrate a candidate by arguing with him over his answers. The school of instruction should not be opened until the examination is over.

Make a collection of all quiz and note books as the candidate accepts his sets of questions.

Seat the applicants so that the temptation to communicate is reduced to a minimum.

Be sure your specimens are good samples of at least average commercial medicines. Have a sufficient quantity of each substance to form a fair sample.

Give applicants an opportunity to think, but do not permit them to waste time on the examination.

Give the candidates a short talk before the examination and furnish each one with a printed set of rules to follow. Do not permit the candidates to wander in at irregular intervals and rush out like a flock of sheep.

#### A SAMPLE EXAMINATION FOR THE AVERAGE STATE BOARD OF PHARMACY.

BY H. M. WHELPLEY.

On page 358 of the American Pharmaceutical Association Proceedings of 1894, appears an article from my pen entitled "Board of Pharmacy Examinations." I then asserted that the set of questions should be so constructed that a competent pharmacist could make a passing grade at any

time without previous "reading up" for the occasion. I have endeavored to arrange the following examination in accordance with the above idea. In criticising it, please bear this fact in mind, and endeavor to view the questions from the standpoint of the average practicing retail pharmacist.

## PRACTICAL PHARMACY.

1. Give an example of each one of the following classes of pharmaceutical preparations and mention their common and pharmaceutical names: *a.* Tincture; *b.* Solution, *c.* Cerate; *d.* Ointment; *e.* Plaster; *f.* Mass; *g.* Pill; *h.* Glycerite; *i.* Liniment; *j.* Mixture.

2. How would you make four fluid ounces of a two per cent. solution of cocaine hydrochlorate?

3. How many grains in one commercial ounce bottle of quinine?

4. Name five drugs liable to be attacked by insects, and state how you would avoid the pests.

5. Name five medicines which should be preserved in a cool place.

6. Name two articles which should be kept away from fire on account of the liability of explosions.

7. The formula for Ceratum Resinæ is as follows:

Resin.....	35 parts.
Yellow wax.....	15 parts.
Lard.....	50 parts,

If you use seven troy ounces of resin, how much yellow wax and lard would you require?

8. Name two medicinal salts very soluble in water.

9. Illustrate, by drawing, the centigrade thermometer scale.

10. Name two medicines which should be preserved in a dark place; also two which should be kept in cork-stoppered bottles.

11. Name a preparation which is a solution of a gas. Name an example of a deliquescent salt; also one which is efflorescent.

12. What do you understand by official preparations, and what book do you recognize as the standard authority on official preparations?

13. How would you test the accuracy of a two-ounce graduate?

14. The formula for Dover's Powder is as follows:

Powdered Opium.....	10 parts.
Powdered Ipecac.....	10 "
Sugar of Milk.....	80 "

How would you proceed to make four troy ounces of the above preparation?

15. Write an order to a wholesale house for ten articles to replenish stock, giving quality and price of each.

## THEORETICAL PHARMACY.

1. Why should drugs be macerated before packing for percolation?

2. Mention an alcoholic tincture and state why this menstruum is employed in its manufacture.

3. What kind of drugs are suitable for administration in the form of infusions?

4. Name and define five different classes of pharmaceutical preparations.

5. Mention a fluid extract in which an acid is used in its manufacture, and state why it is added. What book do you consider the best and most comprehensive work on Pharmacy?

## PRESCRIPTIONS.

1. Write a complete prescription calling for at least two solids and two liquids. Use the metric system of weights and measures. Re-write the above prescription, using customary weights and measures.
2. What precautions do you take to prevent dispensing accidents?
3. What is the meaning of aa., q. s., ad., adde, Mix., Sig., t. i. d., collyr., chart., SS., C.C., gtt., gr., Gr., ℥, O., Cong., ℥, ℥, cm.?
4. Name a combination which might occur in a prescription and produce an explosion when compounded.
5. What is the approximate capacity of a teaspoon? a tablespoon? a wineglass?

## PHARMACOGNOSY.

1. Give a full description of any drug you desire to select for the purpose.
2. How can you distinguish a root from a rhizome?
3. Name a drug as an example of each of the following parts of a plant: Root, Rhizome, Tuber, Corm, Bulb, Twig, Pith, Wood, Bark, Bud, Leaf, Flower, Fruit, Seed.
4. Name a medicinal insect. Name four medicines which are parts of animals.
5. Which of the following drugs and chemicals are, on account of appearance, liable to be mistaken for each other? Kino, Calomel, Potassium Bromide, Columbo, Epsom Salt, Bismuth Subnitrate, Zinc Sulphate, Bryonia, Senna, Uva Ursi, Morphine Sulphate, Buchu, Quinine Sulphate, Phenol, Potassium Iodide, Catechu, Creosote.

## CHEMISTRY.

1. Name ten elements, give their symbols, and mention a salt of each one.
2. Mention a medicinal chemical and give tests for identity.
3. Mention another medicinal chemical and give tests for purity.
4. Mention still another medicinal chemical which can be prepared in the drug store and give process of manufacture.
5. Is there any chemical difference between crystallized and granulated salts? Does the dose differ?
6. What is a test solution?
7. Which is the more soluble, in water, of the two, alkaloids or salts of alkaloids? Name two books on chemistry.
8. How would you test urine for sugar?
9. How would you detect albumen in urine?
10. How would you distinguish morphine from quinine?

## TOXICOLOGY.

1. In case of poisoning from unknown substance, what emetic would you give? Describe in detail just how you would administer it.
2. Name five other substances that might be used as emetics.
3. State conditions under which an emetic should not be given in poisoning cases.
4. Name three poisons and mention their physiological antidotes.
5. Name two poisons and mention their chemical antidotes.
6. How would you prepare and administer the official preparation intended as an antidote for arsenic?
7. Name five poisons which should not be sold to a child without a written order from an adult.
8. In case of poisoning, what conditions of the body would lead you to suspect hydrocyanic acid? Carbolic acid? Sulphuric acid.
9. What is the poisonous ingredient of Paris Green?
10. Have you studied any book treating on Toxicology, and if so by what author?

## POSOLOGY.

1. What do you understand by the dose of a medicine ?
  2. Mention ten medicines and give their maximum doses.
  3. Mention ten other medicines and give their minimum doses.
  4. How do you determine the dose of a medicine for a child, if the adult dose is known ?
  5. How does the dose of a medicine, given hypodermatically, compare with that of the same remedy given by the mouth ?
- Have you a dose book for reference ? If so, by what author ?

## THERAPEUTICS.

1. Define the following terms : Emetic, Carminative, Drastic Cathartic, Hypnotic, Sedative, Sudorific, Diuretic, Disinfectant, Anthelmintic, Astringent.
  2. Give an example of a heart stimulant; an abortifacient; emmenagogue; cholagogue; expectorant.
  3. Why is coriander seed mixed with senna when administered ?
  4. What would you give for an ordinary summer-time diarrhoea ?
  5. What treatment would you recommend for a person who had swallowed a coin or other small metallic article ?
- In what work have you read therapeutics ?

## PHYSIOLOGY.

1. What is the physiological action of a medicine ?
2. What is the object of the circulation of the blood ?
3. What effect has respiration on the atmosphere ?
4. What is the function of the kidneys ?
5. Mention some work on Physiology.

## MISCELLANEOUS QUESTIONS.

1. With what provisions of the pharmacy law of this State will it be necessary for you to conform if you purchase a store after having registered ?
2. Mention the authorities by which each of the following works are published : the United States Pharmacopoeia, the National Formulary, the Dispensatories.
3. What is the American Pharmaceutical Association ?
4. Name the five most important books for a druggist's library.
5. Name a drug, chemical or preparation suitable for microscopical examination, and state how you would proceed to examine it with the microscope.

## THE PRACTICAL EXAMINATION.

While fully approving of the practical examination given by some of the boards, I realize that the majority of boards are not as yet in a position to meet the necessary expense and demand of time. But there is no excuse for the standard falling below the minimum amount of practical examination which I outline. The board should be provided with a collection of from one hundred to two hundred good samples of drugs, chemicals and preparations and a number of recent prescriptions, taken, without special selection, from the files of more than one drug store.

Each applicant should be examined individually and be given ten drugs, ten chemicals, and ten preparations for identification, and five or more prescriptions to read. In addition to identifying the specimens, the appli-

cant should be questioned about them as to their several names, action, dose, habitat, preparations, keeping qualities, etc. Do not fail to ask by what characteristics the specimens are recognized. The candidate should be requested to read the prescriptions and state just how he would compound each one.

The entire set of examination questions should be revised by one member of the board, to avoid repetitions and prevent undue attention to one subject in proportion to that given the others.

The following discussion involving the last four papers read then occurred :

DR. REED : There is a great deal that I hardly agree with that fell from Dr. Whelpley's lips. The attention of examining boards should be called to the necessity of greater definiteness and also limitation in questions. These boards have a function which is different entirely from the examining board of a college. The functions of the board are to ascertain if the candidate can be safely entrusted with the ordinary duties of a retail pharmacist. Dr. Whelpley has given what he would suggest as the kind of paper that would be presumably superior to some that he has seen. A perfect paper, I suppose, is as rare as a perfect picture or a perfect poem; and I have often found examining papers which were abominable, and I think this one has numerous weak points, thus : "Name five drugs liable to be attacked by insects and state how you would avoid the pests. Name two articles which should be kept away from fire on account of the liability of explosions. What do you understand by official preparations and what book do you recognize as the standard authority on official preparations? Why should drugs be macerated before packing for percolation? What book do you consider the best and most comprehensive work on pharmacy? Is there any chemical difference between crystallized and granulated salts; does the dose differ? State conditions in which an emetic should be given in poisoning cases. In case of poisoning what conditions of the body would lead you to suspect hydrocyanic acid, carbolic acid, sulphuric acid? Have you studied any book treating on toxicology, and if so by what author? How do you determine the dose of medicine for a child, if the adult dose is known? Have you a dose book for reference; if so, by what author? What treatment would you recommend for a person who had swallowed a coin or other small metallic article? What is the physiological action of a medicine? Mention the authorities by which each of the following works are published: the United States Pharmacopoeia, the National Formulary, the Dispensatories. Name the five most important books for a druggist's library?"

DR. WHELPLEY : In order to facilitate the discussion and give the author of this paper time to reflect, I think it would be well to continue the criticisms and suggestions until all those who desire to speak have had an opportunity of doing so, and perhaps many of the objections can be answered at the same time.

MR. REMINGTON : I should like to say a few words about the first paper. This paper in my estimation has so much common sense and good judgment displayed in it, that it is worthy of note. I very much like to hear papers from the student's standpoint. I believe that we professors can learn more by being criticised by our students, when we know that the criticism is respectful and that the object is well understood. I think we can learn far more from those who criticise us than from those friends who are continually patting us on the back and saying that we do good work. The point that I want to make on this general subject of examination is this: I want to call the attention of members of Boards of Pharmacy, whose duty is to examine applicants, to a matter which, I am afraid, is frequently neglected.

My knowledge of Boards of Examiners leads me to believe that many examiners rate the answers to the questions on the numerical basis, and use very little judgment in rating the answers. Now that we have been talking about questions, I want to say a few words about answers. I do not believe it is possible for any examiner to get up ten or twenty questions each one of which will be of equal value. The common system is to get out ten or twenty questions, as the case may be, and mark them all at a maximum of ten. If a man answers them perfectly, or reasonably so, he gets ten. I don't believe this is the proper method. It is well enough to have 100 for the maximum; but I believe the examiners should carefully go over the questions and rate them proportionately; for instance, we will say, mark one question 7, and the second one with a maximum of 15, and so on, according to their respective values. Now, Mr. Mason, in his paper, speaks there of some of the questions which were asked in examinations as not being fair, or as being trivial or too technical, or as not being of the proper value. Now when this matter is understood and practically and carefully gone over, and two or three questions given which are of practical value and of the highest merit, and a few questions of a technical character put in, it gives the examiner a chance to determine the grade very much better. For instance, if we have a technical question about specific gravity and some obscure preparations in the Pharmacopœia rated at a certain number and then some good practical questions rated somewhat higher, the candidate answers some of those rated low and fails, and then goes home to his employer and says: "I am required to know all about specific gravity and these obscure preparations, and of course I failed." He neglects to say, however, that the bread and butter and the roast beef in that examination he entirely ignored; he was not able to digest it; he was not able to give intelligent answers on the important points. Some of these hard questions have to be put, because you cannot determine the grade of a man in the class unless you have one or two little things of that sort. If the examiners beforehand let the pupils know that they do not attach equal importance to the questions, but rate them according to their value, it is fairer and, I maintain, very much more useful. Now, I do not want to add to what has already been said. I understand Dr. Whelpley simply gathered these questions together in a hasty way. I want, however, to call his attention to one or two questions there: "How many grains in a one ounce bottle of quinine?" How would you answer that question? Do you mean a quinine bottle with the stopper and everything in, or do you mean the bottle itself? If you mean the bottle itself, it always holds a little more than is put into it. Now, when you are making the questions you should put yourself in the place of the pupil. Sit right there and ask yourself: Can there possibly be two meanings to this? I have seen students sit and lose their time scratching their heads because of an unskillfully put question, because the question had two or three meanings, and they did not want to get up before the whole class and ask explanations, fearing to expose their ignorance, and the poor fellows lost their examinations just on account of the want of a little care in this respect.

MR. HOLZHAUER: I heartily endorse what Mr. Remington has said, with an experience of something like thirteen years on a board of examiners. Sometimes I have feared that the pendulum was swinging too far in the other direction from what it was when it started. I have known candidates who have come before the board for examination and were put questions which I do not believe the majority of that board would have been able to answer. I have known men to come there from our colleges, from the College of New York and from the Philadelphia College, that absolutely failed to pass their examinations. Now, there is something wrong somewhere—either our boards are expecting too much from the candidates or our teachers in pharmacy need a little better education in order to turn out better pharmacists. The original idea of all pharmacy legislation was protection to the public. Take the best men out of the city, druggists

who have the confidence of the community—they might be unable to pass that board of examiners, but does that mean to say that they are incompetent to carry on the drug business in that city? By no means. Another thing, in a State like that of New Jersey, where there are several large cities, and where there is a great body of druggists outside the cities throughout the country in little cross-road places, where they would not have one prescription a month perhaps, are these men to be subjected to the same examination as a man in the city who does nothing else perhaps but make prescriptions? It seems to me we are losing sight of the object for which pharmacy laws were passed. We are taking the idea of raising the education of these men; and in my opinion we have no business to do that, and it is wrong: that belongs to the instructors of pharmacy. Another point is that these boards are constantly changing. We may have an excellent common-sense board one year, and in five years hence we may have a board composed of political tricksters. We are year by year making these laws too stringent, and compelling candidates to be more and more qualified, and are thus putting a rope around our necks that may yet hang us. What are we doing it for? Under the mistaken idea that we are going to benefit ourselves. It is time we would consider this question in a thoroughly proper manner. Let the boards go back to the original idea, and see if a man is competent to conduct business in the place where he is.

MR. CHAPMAN: I have been very much interested in the paper read by Mr. Mason. I think most of the gentlemen present know of the requirement that we have in this Province, that a student has to pass a preliminary examination before he is allowed to go into the drug business. When that requirement was introduced it was purely and simply an oral examination, and a very imperfect one at that. After a while written examinations were exacted; and I think I may say that our examinations at present will bear comparison with any other preliminary examinations that I know of, excepting the English preliminary examinations. There was one thing I was struck with very much in the early examinations, that is, the ignorance of many of the students of the simple rules of arithmetic and their ignorance of their own language, and the stand I took then—and, I believe the examiners are doing it now—was that the student must know his own language and be able to write it intelligently, and he must know arithmetic up to the decimal system. We are even trying to get it a little higher, to have Euclid included. I think a student should be well grounded in his knowledge, especially if he wishes to study chemistry. Then, with regard to this paper of Mr. Mason, I have known how to put myself in the student's position, because I have been a student myself and have had to pass examinations. I have a kind feeling towards students; and it has been one of the greatest difficulties that I have had in compiling questions to get what I considered fair questions, fair to the examiners and fair to the students. Of course the great difficulty is to get the right men on the examining board; and I fancy a great many of us fail to realize what we are put in that position for. Some, I think, try to find out what a man does not know. Then, very often, we are apt to ask stupid and frivolous questions. Dr. Reed is a very good hand at finding out this sort of questions. I have been under his scathing remarks before now; but at the same time I appreciate the fact that we learn more from our critics than from our friends. Then, we should have more practical work in our examinations. The difficulty seems to be, with written examinations, that you often get hold of a student who is a good memorizer, and who will pass that examination; and you get another man who cannot memorize, and yet he is a more practical man than the other. I think the examinations should be both written and oral, and that we should not pluck a man because he has failed in the written and yet has done well in the oral. I agree with Mr. Remington that every question should be valued separately, and not ten marks for every question. In our examinations we have been doing that, and with some of them we do not put the value on the questions themselves, but still we do value them in our work.

**MR. ALPERS:** As a former member of the Board of Pharmacy of New Jersey, and also owing to the fact that at the last meeting of this Association I submitted a curriculum for examination, I naturally take great interest in this matter. I may say that the result of my experience on a Board of Pharmacy is that there is almost nothing but confusion in preparing questions—that is to say, I am not sure myself whether we ask too much or too little. There are so many questions, which the longer you study them, the more confused you become. There are so many things that have to be taken into consideration in order to enable you to be just to the candidate, to the profession, and to yourself. The position of examiner is one of the most difficult positions for a conscientious man to be placed in; and I fully concur in some respects with my friend Mr. Holzhauer, and also with my friend Mr. Remington. Time does not allow me to enlarge on this at present, but I would like to take up this list of questions and ask Dr. Whelpley one or two questions. Is this list supposed to be submitted to examiners as a guide, or are these questions to be given to the students? For instance, in Chemistry: "Name ten elements give their symbols, and mention a salt of each one." Is this question to be put to the candidate in this form or does it mean that the examiner shall name ten elements to the candidate and ask him 'o give the symbols, and a salt of each one? I am not quite sure about it.

**DR. WHELPLEY:** I would answer that the entire set is intended as a guide for a Board of Pharmacy in preparing their questions, but this could be considered either way.

**MR. ALPERS:** There is a remarkable difference whether this is to be put to the candidate or as a guide for the examiners. There is hardly any candidate who could not give ten elements; but it is quite a different thing when the examiner writes down the names of the ten elements and asks the candidate to enlarge on them. Then again:—

"Mention a medicinal chemical and give tests for identity." The most ignorant could probably give one of these; and it is entirely impossible to sift the good men from the bad men by giving such a question; because the one who can give all the tests would not be in any better position than the one who can just give one and no more.

Then all these questions about different books are entirely out of place. It is entirely immaterial whether a man who sits before the examiner has studied out of books or journals. The only book he should know something about is the Pharmacopœia, and the only book he should be examined upon is the Pharmacopœia. I do not mean that the only book that he should have as a library should be the Pharmacopœia; but it is entirely immaterial whether he studies from one Dispensatory or another. Besides that, the answers to some of these questions are entirely impossible, for instance, to give the list of books for a good library. If these questions, however, are intended as a guide for examiners, I believe they are good.

**DR. STEWART:** If you have a question on therapeutics, it seems to me you should also have a question on diagnosis. Take Question 4, Therapeutics, What would you give for an ordinary summer-time diarrhœa? I would also have another question: How would you diagnose an ordinary summer-time diarrhœa? And if a man could not answer that, you should not let him pass.

**DR. PAYNE:** I am one of the members of the Georgia State Board of Pharmacy; and there are some of these suggestions which we have had in use for a number of years. One of them is with regard to practical questions. We have different grades. If a man obtains 65 per cent. of the maximum number of points it gives him a license and the title of 'Druggist;' if he obtains 75 per cent., it gives him the title of Apothecary, and 85 per cent. gives him the title of Pharmacist. We find that this works admirably. Many men who pass the first examination come up a second time and pass very good examinations, and many come up a third time; and we always arrange our questions so as



to have at least 65 per cent. of the questions practical questions. In the scientific questions, we desire, of course, that these men who are to enter the highest grade shall answer a number of them, and shall have the highest requisites. We find that the system gives entire satisfaction.

MR. GOOD: I am sure we get some benefit from these discussions, whether we examine students in colleges of pharmacy, or whether we are on Boards of Pharmacy. I am sure I have got some good points by listening. I have been examining students for the last twenty-five years. On the matter of examinations by Boards of Pharmacy Mr. Holzhauer makes this point, and it is worthy of consideration, but yet it is in a certain sense weak. He says, Why should we consider the person who is called upon to compound one prescription in the same light as one whose entire business is devoted to compounding? If it were possible to give that man who is to be at the cross-road place a special examination, and say to him: "You shall stay there"—that would be all right. He comes up before you for examination, and you consider the locality from which he has come, and you consider the demands of that locality, and if you have but one grade of certificate to give him, there is nothing to prevent him going on to New York the next week, and he carries your certificate, and you are held responsible for it just as though you had put him through the most severe examination. Now, we undoubtedly get the sympathy of the students by putting ourselves in their places, and it is desirable that we should do so. I would say further that much legitimate help can be given to students by certain kindnesses which a professor can show. Now, as to Mr. Remington's remarks about the student who does not like to show his ignorance by asking questions with regard to ambiguous questions—I do not hold myself up as a model examiner, but I would say this, that I never give out a set of questions without inviting inquiries from the students. I say: I want you to understand that question, and if you find anything obscure about that, ask, and all legitimate explanations will be given you.

This manner of rating that Mr. Remington mentioned is an excellent idea, that is, to get away from the absolute rating of ten for each question; and as he has properly said, you have no way of distinguishing the very excellent student from the comparatively good student, except you do give some questions which show that that student has during the course of his time been a close one, that he has studied the specific gravity of substances, that he knows about the properties of pharmaceuticals and chemicals, and a little more than the average druggist is required to know. As to the manner of conducting examinations, written and oral, and practical and theoretical, you cannot get a man's acquirements unless you include all four of these. The theoretical and written examinations alone will not be sufficient. You want to know what a man can do practically, and above all, you want to come in personal contact with him, and ask him some questions and note the character of the answers, and, although they may be correct, yet there is something more about the oral answers which carries with it a little more than the absolute answer. There is something personal about it, which aids you very much in making up your estimate of that man.

MR. FROST: We have in our Board of Pharmacy not only written but also oral examinations, and I could not help taking exception to the remarks made by our worthy Chairman on the result or definite results of oral examinations. Now, we have an oral examination; and if he will come into our secretary's office any day, he can get a definite practical result from any candidate that we have ever examined. We can tell him from the records that we have of oral work the mistakes that he has made and the answers that he gave correctly. Our Pharmacognosy examination we consider a very important one; and as far as the difference in the examination which should be given a young man from a village and that which should be given a young man from the city, it is impossible to make any distinction. If we examine a young man for a village pharmacy, there is

nothing to keep him there. After we let him loose he can go into any part of the State; and the idea of having a different examination is not at all practicable.

MR. WILLIAMS: I have enjoyed very much these papers this afternoon. I have been on a Board of Examiners a good many years and have met with many impediments. As you all know, in this Province there are the dual languages: some candidates require examination in the English language, and some in the French language. It is very difficult in our Province to compile questions for the French and English candidates. You will find terms in one French book that you will not find in another, and you will find terms in the English books that you cannot very well translate into French, and vice versa, except in Botany. Our papers are drafted in the English language, and then translated into French, and sometimes we have been obliged to cut some of the questions out, because of the impossibility of translating them intelligently. I believe fully in these remarks as to the necessity of having written and oral examinations; because I have known candidates who have passed very good written examinations, and when they came up for the oral they were nowhere. I think also every candidate should be examined practically and theoretically. He might know a little theory, and yet be at sea so far as practice goes. What we want is a good fundamental education, and still a practical one; and if this line is followed out, it strikes me that in a short time all our pharmacists will be worthy of the diplomas which they receive.

MR. BURGE: Mr. Chairman, this discussion has been of great benefit to me; there is one important thing that I think we should do, and that is to get organization among our Boards of Pharmacy in some way so as to have an annual meeting. I came on to this meeting expecting to see a larger representation from the Boards of Pharmacy, and expecting from the discussions we have had through the journals to learn something on the way of perfecting organization among the Boards of Pharmacy of the country. In Tennessee we have not gone so far as in other parts, as we are a young board, not giving any oral examination nor submitting any specimens for identification. That part of it we will have at our next examinations, the identification of specimens of drugs and preparations. We require 75 per cent. for a registered pharmacist and 60 for an assistant. All examinations are embraced under the heads of *Materia Medica*, Pharmacy, and Chemistry. Prescriptions come under the pharmaceutical head, and in the questions in chemistry we give no equations or anything of that kind to be worked out. We try to make our questions as practical as possible to apply to every-day work in the store, and give as little theoretical examination as we can.

DR. BARTLEY: I certainly thought that out of all this talk we should learn something in regard to new ways of examination of students. Certainly that should be the object of all such discussions. I have been an examiner since 1873, and I have been interested a number of times in picking out students and putting down before them the number of the percentage that I thought those students could get. I have been afterwards interested in noticing the result the students could actually get on the examination, and I find that I can go very close to it. I have also been interested in other things: taking a written examination and comparing it with an oral examination, made by a different individual, and have noticed how particular deficiencies run. I do not believe in oral examination; I believe in a written examination. If I should say that I do not believe in the written examination, it would be equivalent to going back about fifteen or twenty years, when the oral examination was the rule, and the written the exception. Almost all examiners have left that practice and gone to the practice of written examinations. Now, a man who is in the habit of examining students, who is in the habit of reading examination questions that have to determine the man's ability, not only notices whether the question is answered correctly or not, but he also notices how

that man expresses himself, whether he expresses himself clearly and to the point, or whether he is haphazard in the use of words; whether he jumbles a lot of words up as though they came out of a hole bored in the bottom of his brain, being put down on the paper as they happened to come out. That, it seems to me, is a very important matter in an examination. If this point of clearness of expression be taken into account, you will be able to form a very good conception of not only the man's ability, but of his general intellectual activity. After all, the examination of a student for registration as a pharmacist is simply to determine whether he is a safe man to put behind a counter, and any method that will determine that will be proper. I want to relate just one experience with the local board of pharmacy with which I am connected. By some unfortunate force of circumstances—I don't know just why—a very large number of candidates comes before our board. The candidates are examined monthly, and for the last year there have been from thirty-five to forty-five every month. In June we usually have a large class, because we do not examine in July and August. In June last we had forty-eight, who rushed in with the idea that they would get through before the summer months, and out of forty-eight, two passed the examination as fully competent. Now, that has been the experience more particularly during the last year, and I hardly think our questions were more severe than usual. The experience has been that out of a class of forty about six or seven or eight would pass. A large number of these applications came from Polish people, two-thirds or three-quarters of the applicants who came before our board being of that class, and we have caught a number of them making false affidavits as to what experience they have had in stores. Our state having several boards, we have a regulation that if a man comes up before one of the boards and fails, he cannot apply within six months to any of the other boards. They try to get over that regulation, and we have great difficulty in tracking them. Now, if some one will give me a tip as to how we can regulate that, I propose to give him a tip as to how we can regulate the substitute afterwards.

MR. REMINGTON: I want to be very brief. I would like to know, and I have been striving to make out, what advantage there is in having boards of pharmacy. I believe that most of them are in the habit of having but one set of questions, and requiring 60 per cent. for an assistant, and 75 per cent. for a proprietor. Now, I have been told that the real reason of this is laziness on the part of the board. If that is the reason, it certainly ought to be corrected. I am open to conviction, but it is not my opinion that this is a good practice. I do not believe that one set of questions should be given both classes of applicants. It seems to me that the difference of 15 per cent. in the rating of the answers on the same set of questions is entirely too small. There should be two separate sets of questions, one adapted to the qualifications of the proprietor and the other adapted to the qualifications of the assistant.

DR. BARTLEY: The reason for that is not alone laziness. I admit that I am lazy, but I will not admit that all our boards are lazy. This is the reason, I think, in all cases with which I am familiar—I presume it is not universal—but in our State there are no applications for assistants in pharmacy: they all apply for the position of pharmacist, and so we have only one set of applicants, and we can only have one set of questions.

MR. ALPERS: I wish to remind the Section that this question has been argued at our last meeting, and that we have put ourselves on record as recommending two different examinations. It was part of the curriculum that I submitted, and I brought forward arguments why the two examinations should be entirely different from each other, which, I believe, will be endorsed by any intelligent board. It is entirely wrong to give one set of questions, expecting that one set of men would know a little about them, and that another set of men would know a good deal. This, I think, is putting a premium on carelessness.

MR. BEAL: I do not care to prolong this discussion, for the reason, I think, that this subject is worthy of special attention, and should not be considered incidentally to other matters. But in reply to what Mr. Alpers has said I think it is safe to say, as I said in my report, that a man who applies for examination as a registered pharmacist may not make a sufficient number to justify granting him a certificate, but may indicate very clearly that he is qualified as an assistant, and in that case he should be given the option of taking out an assistant's registration.

DR. WHELPLEY: Mr. Chairman and Members: Before speaking on the subject of examination as considered in my papers, I desire to state that the question which Mr. Remington raised relative to the rating in examinations came uppermost in my mind when preparing this set of questions, and I felt it was a subject demanding so much attention that it would be well to have it considered under an entirely separate heading; so that these papers are not gotten up in the way in which they would be if they were to be accompanied by an explanatory paper stating just how they should be rated. The point that Mr. Remington makes, that scarcely any two questions should be rated on the same numerical basis, is certainly a correct one, and I know that many of our boards follow that method in making their averages: they give a certain number of points in proportion to the value of the whole examination.

A word relative to the impropriety or injustice of requiring a drug clerk or druggist in a small town to pass the same examination as those in larger cities. Boards of Pharmacy have a certain amount of discretionary power which they can exercise, and there is nothing to prevent them from being perhaps a little at fault in kindness when a man eighty years old who has been in business for fifty years in a small cross-road place applies for examination; but when a young man of twenty or twenty-five applies for examination, it is presumable that before he gives up the drug business he will try in more than one section of the State, and it is also probable, if he move, he will move to a larger city, because the average drug clerk has an idea that the large city is the Mecca for all drug clerks. I should have been disappointed if this examination paper had failed to draw out criticism, because I hardly thought it would meet the approval of every person, since it did not meet the approval of the author. I, however, feel it averages well. Some have criticised it on account of its severity, and others on account of the unskillful questions to be found in it, or others again on account of its being too easy; so perhaps it will average well. One criticism is to therapeutics, which would lead on to diagnosis, which would take us into pathology, and in another step into surgery and into gynecology, and so on forever. So it was necessary to stop somewhere. I stopped after passing the point of therapeutics; and I would in sincerity ask the person who criticised the paper on account of one question in therapeutics whether he would put in charge of a store a clerk who could not give a prescription for an ordinary case of diarrhoea. I would ask him would he employ a clerk who had not a sufficient knowledge of therapeutics to write out such a prescription?

DR. STEWART: I think I would. I do not think it is his business.

DR. WHELPLEY: As to the criticisms which opened the discussion, and which were quite thorough, I would like to say that the majority of them were criticisms which were based upon opinion rather than perhaps upon judgment as to the propriety of these questions. There is, however, one point; Dr. Reed says that he would not ask such a question as the following: What book do you consider the best and most comprehensive work on pharmacy? I don't think there is any member here, either on the board of pharmacy or otherwise, who would hesitate in a casual oral examination of an applicant for registration to ask him such a question as that.

MR. ALPERS: May I give the correct answer to that? The correct answer is, the book written by the examiner—and then he gets ten.

DR. WHELPLEY: I do not think there is any one who would hesitate to put to a student a question which would elicit from the student his knowledge of books. He may not be familiar with any other book than a certain quiz compend. You will find that it is a guidance for questions in a subsequent examination, and I feel that questions of this nature test the applicant's knowledge of books on the various subjects connected with pharmacy.

Another point made by Dr. Reed: How do you determine the dose of medicine for a child if the adult dose is known? The criticism, if I remember correctly, was that there are several ways of finding out the dose. Very true, and any one of them approximately correct should be an acceptable answer; and the mere fact that there are four or five different methods of approximately estimating the dose would not prevent the action of the fluids if the applicant failed to know another of them and administered a poisonous remedy.

On motion the Section adjourned to meet again at 8:30 p. m.

#### SECOND SESSION—SATURDAY, AUGUST 15TH, 1896.

The Section was called to order promptly at 8:30 p. m., by the Chairman.

The first business in order being the election of officers, the nominations were on motion declared closed. Mr. Beal asked permission to withdraw his name from nomination for chairman and moved that the secretary be instructed to cast the ballot of the Section for the other nominee. It was so ordered, and the secretary cast the ballot of the Section for C. S. N. Hallberg, as chairman for the ensuing year.

On motion, Dr. Whelpley was directed to cast an affirmative ballot for Jas. H. Beal for secretary.

The Committee on Chairman's address made the following report:

The Committee to whom the Chairman's address was referred submit the following report:

The one specific recommendation of the chair should be adopted. It is as follows: That the subject of preliminary education be presented by the Committee of this Section to the various State Pharmaceutical Associations for consideration and report to this Section at its next annual meeting.

Second, we approve the opinion expressed by the chair, that a distinction should be made between graduates with practical experience and those without it. The degree of Ph. C. should be confined to the latter class, and that of Ph. G. should designate those who have graduated with a store experience. In view of the confusion in this respect, because of the present practice of the Colleges of Pharmacy, we recommend that all boards of pharmacy use their influence to secure such amendments to their laws as shall require an examination for *all* candidates for registration.

In the opinion of the committee the interchange of certificates of examination is desirable, and will follow when a reasonable degree of uniformity is obtained in the examinations of the different boards of pharmacy.

S. A. D. SHEPPARD,  
ALFRED B. HUESTED,  
E. H. BARTLEY,  
*Committee.*

On motion it was ordered that the report be received and the recommendations contained therein be adopted.

Dr. Whelpley read the following paper, which on motion of Mr. Watson was received and referred for publication :

#### A DUTY PHARMACISTS OWE THEIR UNREGISTERED APPRENTICES.

BY H. M. WHELPLEY.

In this country of rapid growth and startling development, we become accustomed to great changes in our laws, habits and customs without fully realizing their real significance. Thus it is that the older pharmacists who registered on account of being in business, or on their diplomas, pay but little attention to the apprentice who is anxious to register on a certain date, usually not far distant.

The young man, or woman, true to that practical turn of mind which characterizes the apprentice when confronted with a task, looks around for the easiest means of registering. A species of instinctive reasoning suggests a visit to the next examination, "just to see how it is conducted." After the ordeal is over the apprentice returns home not one degree sadder, but much wiser, and at once seeks the quiz book which contains the greatest proportion of the questions asked on the examination.

It is unnecessary for me to dwell on the folly of such a course. It is not only time and money wasted, but a wrong estimate is formed of the purpose of registration.

The same amount of money spent for suitable books, and scarcely more time devoted to them, under the direction of the preceptor, would have placed the apprentice in a position to pass any reasonable board examination. What is more, a proper habit of study would more than likely have been formed.

In order to learn the approximate proportion of candidates who take the examination for the purpose of gathering information, I addressed the following letter to the secretary of each of the forty-nine boards of pharmacy, and received replies from twenty-eight :

We are confident that a large number of the candidates for examination before the Boards of Pharmacy attend the first time with a view of becoming acquainted with the methods of the examination, when the money and time spent should have been employed in preparing for the examination. In order to obtain more definite information on the subject, we would ask you to give approximate answers to the following questions :

1. About what per cent. of those who apply for examination before your board fail to pass on their first appearance?
2. About what per cent. of those who fail on their first examination apply with the idea of becoming familiar with the methods of the examination and are not surprised at their failure?
3. About what is the average expense borne by a candidate appearing before your board for one examination? We refer to the expenses including railroad fare, hotel bills, etc.

The average of the twenty-eight responses is as follows: Question No. 1, fifty-two per cent. Question No. 2, twenty-four per cent. Question No. 3, §14.

Cannot the American Pharmaceutical Association take some action which will awaken the registered pharmacists of this country to a realization of their duty in this matter?

The next paper was read by Dr. T. D. Reed, of Montreal, Can., and after considerable discussion by Messrs. Alpers, Stevens, Thompson, Sheppard, Bartley, Hallberg and the author, was on motion referred to the Committee on Publication.

TO WHAT EXTENT SHOULD A CANDIDATE FOR REGISTRATION IN  
PHARMACY BE REQUIRED TO BE FAMILIAR WITH THE SUBJECTS  
OF MICROSCOPY AND VOLUMETRIC ANALYSIS?

T. D. REED, M. D.

This question pertains to the work of State and Provincial Boards. Let us first consider the creation, the function, the work of these Boards. To obtain pharmaceutical legislation in a district in which none existed before, the pharmacists applying to the Legislature invariably urge the public safety as the prime reason why certain powers should be given them to examine all persons who would open drug stores; the desire being that these persons should prove that they might be safely intrusted with the putting up of physicians' prescriptions and the handling of poisons.

The Boards thus are created for the special purpose of ascertaining if the applicant can be considered fairly safe in the performance of these duties. The business of the Boards, evidently, is not to inquire into the relative acquirements of candidates, nor to erect a high standard, nor a low standard, of scientific knowledge, nor to test manipulative skill; but essentially, and perhaps solely, to form a conclusion as to the safety of the candidate as a dispenser and pharmacist.

The Boards will be composed of so-called practical men, the appointments being made, it may be, for reasons political, social, or financial, and from the ranks of those who have not themselves, in most cases, had any college or scientific training.

Registration examinations have been heretofore largely, and in many cases entirely, by a written paper. This, it may be admitted, is the least troublesome method for the examiners, and the most expeditious for the candidates, and serves to exclude the very ignorant, and, as dense ignorance and unsafety go together, the result is often satisfactory.

But would it not be better if the Boards made their examinations along these lines?—

Can this candidate be trusted to notice the error of a drug erroneously labeled, or decide upon it without a label—say cream of tartar and tartar

emetic, gentian root and belladonna root, etc.? Would he recognize slips of the pen in prescriptions as to doses, or in drugs ordered?

It is not so much by the sphericity of his pills, nor the smoothness of his emulsions, nor by his ability to complete a chemical equation, that the safety of the public is secured, but by a sufficient practical acquaintance with the details of pharmaceutical work, and familiarity with the appearance and doses of drugs and poisons.

As a man might be a safe man and a successful pharmacist without any practice in Volumetric Analysis or Microscopy, the best proof of which is, that many of the prosperous, and even leading men, who are appointed to Boards, have no practical knowledge of these subjects, it seems to me that Volumetric Analysis and Microscopy need not be included in Board examinations for registration.

Being myself a teacher, I do not belittle the importance of these subjects in a pharmaceutical education. I believe that a college diploma is not worth much which does not cover a strict examination on these subjects; but it is registration examinations *only* which are here discussed.

My conclusions may be stated thus:

"A Board Examination for Registration should be almost entirely practical, and should comprise the recognition of drugs without label, a knowledge of posology, a testing as to ability to prepare in presentable form, moderately difficult prescriptions, a general knowledge of the usual medical action of commonly used drugs, and some knowledge of toxicology.

"The subjects of Microscopy and Volumetric Analysis are not required of candidates for registration."

*Montreal, Can., July, 1896.*

The following paper was read in abstract by the author, and upon motion received and referred for publication:

#### SOME ODDITIES IN THE PHARMACY LAWS.

J. H. BEAL.

One who sets out to find fault rarely has to travel far to discover the object of his search. Especially is this true if he be searching through the pharmacy laws for subjects of criticism. This could hardly have been otherwise, considering the circumstances under which pharmacy legislation has been obtained. Almost every law has been enacted only after a sharp legislative contest, and very many bear the evidences of having been a compromise between what the friends of the measure desired and what the legislature could be coaxed or coerced into granting. What has been granted has in most cases been conceded grudgingly, and in exchange for the assumption of extraordinary burdens by the pharmacist. Another fruitful source of inconsistent provisions is that some of the measures are a



veritable patchwork, made up of sections taken from statutes in force in other states, and enacted into law without first trimming off their points of disagreement. However these inconsistencies may have gotten into the law, whether through the carelessness of friends or the designs of enemies, they are there, and the profession must make the best of it.

#### A BOARD OF PHARMACY WITHOUT PHARMACISTS.

It is usually conceded that a pharmacy board should be made up of men having some knowledge of pharmacy, but one law provides a board not one of whose members need be or is, unless by accident, connected with pharmacy. The board in question is composed of the Attorney-General, Secretary of State, Auditor of State, State Treasurer, and the Commissioner of Public Lands and Buildings. Fortunately this wonderful combination of the departments of justice, statecraft, finance and agriculture is permitted to employ certain pharmacists as "secretaries" or "examiners," who perform the real functions of a board of pharmacy, and receive the maledictions of the disappointed candidates for registration. Lest, however, the employees should not at all times feel with full force their dependency upon the powers that be, it is expressly provided that the board of pharmacy (!) "shall have power to discharge any of the said examiners at any time."

#### GRADUATES WHO DO NOT GRADUATE.

It is generally admitted that in some of the eastern states considerable progress has been made in the matter of pharmaceutical education, but in this respect they have been altogether outstripped by a western state, whose law declares that any one shall be a graduate in pharmacy who has had four years' experience in a drug store. For the sake of the people of that state who have to take medicine occasionally, it is to be hoped that the Legislature will not abandon its "experience before graduation requirement" without careful consideration.

#### EXAMINATIONS.

Usually the law does not specify the scope or character of examinations, wisely leaving such matters to the discretion of the pharmacy board. Several laws, however, do indicate in a general way the character of the test to be given, while one goes so far as to require that all examinations shall be upon "written questions and answers," thereby excluding everything in the nature of a practical test of the candidate's knowledge.

In several laws the boards are given authority to conduct examinations by mail. Possibly but very few of the boards avail themselves of this privilege at the present time, but if they do, what an opportunity it must afford for a quiet pony ride by an anxious candidate.

## LICENTATE VS. GRADUATE.

A peculiarity which appears in a number of the laws is the distinction made between "licentiates" and "graduates," the former term being applied only to those who pass an examination, and the latter to those who are licensed on diploma. Is not this distinction unwarranted? If the writer understands the term licentiate, it is properly applied to any one who is licensed to perform a particular service, without regard to the manner in which the license was obtained.

If graduates were permitted to practice without license and registration, there might be some ground for the distinction; but when they are licensed they become licentiates, whether the legislature calls them such or not. Surely there is confusion of tongues enough in America, without the pharmacy laws adding to the babel.

## THE GROCERY DEPARTMENT.

In attempting to satisfy the demands of the country members, the legislatures have in some instances made the exceptions in favor of dealers in general merchandise so broad as to seriously cripple if not entirely nullify the pharmacy act. For example, certain statutes permit general merchants to "keep and sell such poisons, acids, and chemicals as are regularly used for agriculture, mining and the arts," another "the commonly-used standard medicines and poisons," another "all such medicines and pharmaceuticals as are required by the general public." From still another statute we learn that "nothing in this act shall be construed to apply to the sale of drugs, medicines and poisons by dealers in general merchandise," and again in the same law "that the provisions of this act shall not apply to the sale of insectides, nor any substance for use in the arts."

What there is left for the poor druggist to sell after such exceptions as these it is hard to determine.

Under such a law if a man call himself a druggist he must qualify by examination before the state board before he can dispense medicines and poisons, but if he choose to be a general merchant, he may deal in almost every substance known to medicine or pharmacy without the necessity of possessing any knowledge whatever of the articles sold.

Inconsistencies similar to the last are found in some of the poison and label laws and in the provisions relating to adulterations.

In some states the only law prohibiting adulteration is that found in the pharmacy act, and this clause frequently so worded as to make it applicable to pharmacists only, general dealers being excepted from the provisions of the act. If a pharmacist sell cream of tartar 5 per cent. below the standard he may be fined, imprisoned and his license to practice pharmacy revoked; but the general merchant may sell under the same title stuff that is 50 to 75 per cent adulteration, and none may molest or make him afraid.

Such inconsistencies are also found in some of the poison and label laws. For example, in one state if a druggist sell 5 cents worth of black cohosh he must label the package poison, the purchaser must be interrogated as to his knowledge of the drug and the use he intends to make of it, cautioned regarding its dangerous properties, the circumstances of the sale recorded with great minuteness, and the record preserved for five years. According to the same law a grocer may sell a large list of enumerated articles, including such substances as the salts of iron and copper, preparations of mercury, podophyllum, lobelia, carbolic acid, etc., without let or hindrance, and without the necessity of either label or record.

#### THE WICKED PHARMACIST.

One other oddity, or perhaps it were better termed an outrage, may possibly be worthy of mention. Certain laws contain provisions which in effect declare that a pharmacist who is charged with violating the law shall be taken as guilty until he establishes his innocence. For example, "every sale of liquor shall be taken as illegal until the contrary is shown," and that "in all prosecutions under this act the burden of proof shall be upon the defendant." In plain English, that pharmacists are more dangerous than ordinary criminals, and must not be allowed the privileges commonly accorded to men accused of crime. A horse-thief or burglar must be presumed innocent until the state establishes his guilt beyond a reasonable doubt, but the wicked druggist shall be executed first and tried afterwards.

Verily, is not the pharmacist the most complete personification of scriptural charity to be found on the round earth—for may it not truthfully be said of him that he suffereth long and is kind, that he seeketh not his own, is not easily provoked, beareth all things, believeth all things, hopeth all things, and endureth all things.

*Scio, O., July, 1896.*

A paper, entitled "Liquor Selling in Drug Stores," by Mr. Whitney, was read in abstract by the chairman, and after a few brief comments by Mr. Sheppard, was referred to the Committee on Publication.

#### LIQUOR SELLING IN DRUG STORES.

BY H. M. WHITNEY.

##### A REPLY TO QUERY NO. 5.

Is the sale of intoxicating liquor in a drug store strictly for medicinal purposes a necessity, or would it be wise to prohibit the sale, excepting in compounding, absolutely?

This query was sent to me, "because of the importance which the question has assumed in Massachusetts, and is proposed in such terms that it opens up the whole liquor question in connection with pharmacy." If I should simply give an individual opinion, without a statement of facts in

our experience, it would be, as it seems to me, of little value. I feel therefore that I must, as briefly as possible, quote from the records of the board of pharmacy, and press comments, that you may have as much data as possible in a paper of this kind. We are also at liberty to discuss this question, not alone as pharmacists, but as the public view it; nor are we confined to strictly medicinal liquors, or to a drug store in its true sense as a pharmacy.

The question implies that the keeping and using in compounds of intoxicating liquors is a necessity, and any one who takes exception to this position I refer to page 373 of the United States Pharmacopœia of 1890, where we find *Spiritus Frumenti*; on page 377 we have *Spiritus Vini Gallici*, and on pages 447 and 451 we find *Vinum Album* and *Vinum Rubrum*. This plainly and clearly exhibits the fact that intoxicating liquors are pharmacopœial remedies to be used for medicinal purposes, and no one can consistently claim and maintain that a drug store without the official remedies named in the United States Pharmacopœia as liable or likely to be called for, is entitled to be rated as a complete pharmacy. Possibly some will say it is hardly fair to assert that a pharmacy is incomplete which does not keep intoxicating liquors, when there are many reputable drug stores that will not carry in stock Phosphorus, Cyanide of Potassium, Arsenic, etc. It is not claimed a pharmacist is obliged to keep and sell liquors or any of the poisons, but the claim is made that they are legitimate remedies and the pharmacist has a right to keep and sell them, provided he always complies with such rules and regulations as may be required by statute.

I submit without further argument, that the United States Pharmacopœia, which is our official guide, declares that intoxicating liquors for medicinal purposes are a necessity in a drug store, as a complete pharmacy.

No one will venture to assert that the indiscriminate sale of every article in a drug store is wise, proper, or permitted by any reputable pharmacist.

A pharmacist from necessity is the custodian of many articles that may be, and often are, used unwisely, improperly, and ignorantly. His responsibility is not to be compared with that of the statesman, the broker, the tradesman, or the politician, but may be compared with that of the commanding officers of an army, the physician, the surgeon, the locomotive engineer, or the captain of a steamship. His trust is not only one of comfort and health, but of life and death. The responsibility of the pharmacist is so great that in almost, if not every state in the Union, and in every country of the world, laws are enacted to regulate and control his actions, limiting and defining them.

Perhaps some one may ask, why should there be so much law controlling the pharmacist in the pursuit of his business? Is it a fact that there is more restrictive legislation for the pharmacist than for other equally hazardous and possibly destructive agencies? The commanding officers

are subject to court-martial and disgrace ; the surgeons and physicians to heavy fines and imprisonment ; the engineer, the captain of a steamship, the pilot, and many others, are hedged about with as restrictive and controlling laws as the pharmacist. It seems to me, a very brief examination of the Statutes, a comparison of possible hazards to the people, will not exhibit an unfair or excessive control of a drug store.

It is a common remark, "You cannot make people good by law," or "you cannot legislate morals." I quote from the New York Journal, "To deny the principle that law can do anything to protect the weak, the ignorant, and the unstable in character from the demoralizing influence and seductive temptations with which for gain the wicked surround the weak, is to wipe out of the law its most essential and beneficent portion, which is preventive rather than punitive. It is to deny that public policy can impose any restriction upon personal license, or protect society from degradation. The flippant phrases infallibly reveal either shallowness of thought or sympathy with vice."

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"Would it be wise to prohibit the sale, excepting in compounds, absolutely?"

This is the difficult part of the query, and I have no desire to antagonize any whose experiences, location or environments prompt them to answer in the affirmative. Let us very briefly consider some facts, not mere rumors, suspicions, general charges, or partial convictions, but admitted facts, given under oath, taken down at that time by a stenographer and in my possession. Do not for a moment assume that the facts that I give are general, but exceptional, special and local. At the same time bear in mind that one to twenty per cent. of adulteration is a fraud ; that certain physical afflictions are contagious ; that too often in the present rushing age, the average man follows the lead of his successful rival, and that in almost every locality you will find a saloon or muslin drug store, a cutter, a poisonous and death-breed-  
germ.

BRIEF EXTRACTS FROM TENTH ANNUAL REPORT OF MASSACHUSETTS STATE BOARD OF  
REGISTRATION IN PHARMACY.

1st. I came from London in 1869 and went to Ottawa, Can., was there seven years and then moved to New Brunswick ; was fourteen years there. My drug business here amounted to about seven dollars a day. It was a matter of impossibility to tell how to do business without the liquor." This man was fifty-nine years of age.

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2nd. (A registered pharmacist in the employ of a former liquor dealer.) *Complainant* testified, "Called at the store and the clerk rushed to the back room. I followed him and found four men there, two of whom had glasses in their hands, drinking ; the clerk grabbed all the glasses and dumped them into the sink ; I asked him why he allowed this to go on in this way ; he said he had to get a living." *Defendant* testified, said he had worked in this place nine months, that he did not engage to attend to the back room ; that he was paid fifteen dollars a week and a commission amounting to two or three dollars a week extra. "I admit it was wrong ; I did not realize that I was using

my certificate for an unlawful purpose; I told the proprietor that I must leave the store, as I did not wish to risk the loss of my certificate of registration; he offered me an increase in salary, and I remained."

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3rd. Complaint was read and defendant admitted the charges were true, and stated, "I did not like that method of doing business, and I wanted to get out, but my partner did not want me to. We have sold liquor to be drank on the premises. We did make fifty or sixty sales at least on the Sunday in question."

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4th. Chief of Police testified: "Examined books of the applicant during license period and found that they would not show more than fifty or sixty sales a day; on holidays more." When asked if there was more sickness on holidays than usual, answered, "No, but had more calls." "My general impression is that other stores were doing about the same, in some cases more. This store has less liquor on hand than some others." The applicant testified, corroborating the statement made by the chief of police, and stated that his sales amounted to twenty-five or thirty dollars a day. On figuring up the value of his liquor sales, it was apparent that they were two-thirds of his business.

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5th. "At one time there was some talk about my sales, and I inquired of the board of selectmen, who gave me to understand that I had a right to sell up to four and seven-eighths gallons, provided the sales were registered; also said I could sell beer by the case. I may have been wrong; thought it was all right."

Q. Is that not wholesale business? A. Not at four and seven-eighths gallons; over five gallons would be.

Q. You carry how much altogether of stock of liquors? A. Probably eight or ten barrels.

Q. You do some prescription business? A. Yes, some.

Q. Three or four a week? A. Yes; perhaps a few more.

Q. Do you show the doctors any courtesy, or pay them a commission on the business? A. Yes, sir.

Q. If they should say, "Mr.——, I would like a little whiskey or brandy," would you object? A. I would not give it myself; they might help themselves.

Q. Do you mean to say under oath, no physician has ever been in your store during the past two years and drank a little whiskey or brandy? A. I have not helped them myself.

Q. You don't mean to say that it has not been done? A. They probably have.

Q. You have given the board something of an idea of how you have conducted your business during the past two years; is that a fair sample of what you have been doing during the fifteen year's residence in ——? I may have been a little more slack, but for the last two years I think I have been living up to the law more than I ever did before.

Q. You have, then, during the past two years, been a little more careful than you previously were? A. Yes, sir.

Q. In other words, you sold more liquor during the first thirteen years of your business than during the last two years, and have somewhat reformed? A. Yes, sir.

Q. You have never sold liquor to be drank on the premises? A. I have before *two years* ago.

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6th. Q. Do you mean to state to this board, under oath, that in order to get physician's prescriptions you pay, and it is the common custom to pay them, from twenty to seventy-five per cent. of the receipts of every prescription they send you? A. I will tell you my experience. I had to pay from twenty to fifty per cent. to doctors out of my

profits. The doctor would come around the first of the month and look up his prescriptions, and I would deduct the cost and then give him from twenty to fifty per cent. of the profits; and my belief is that I have lost a great many prescriptions by not paying them as much as my neighbor druggists. One of the leading doctors told me himself and showed me his books, that he was getting most of the profits from his prescriptions sent to such and such a place. He said, "I think more of you as a druggist than those parties, but I am in it for money, and they pay me more than you are willing to pay." For this reason I have lost lots of trade. That is under oath, and I insist it is true.

Q. Do you know, or is it your impression, that physicians go to drug stores and get a little liquor when they are tired and it is furnished them? A. I think such is the case in some stores; that is my impression; I don't want to say it is a fact, although I do know of one store in particular, a common place for doctors, lawyers, etc., to go in and have all the drinks they want, from lager to champagne: this is a fact, as I have been there and seen it myself. I believe from the bottom of my heart that these laws have been made to protect a legitimate druggist; and I believe if we had had this protection five or ten years ago, I would not have had this trouble; anybody, particularly in —, that wanted to start up a drug store, could do so.

Q. What amount of liquor business have you done? A. I am not prepared to answer that; I know I did not do as much as some other druggists.

Q. Some twenty or thirty sales a day? A. Very likely I did.

Q. If I understand you, these stores in — opened largely for the liquor business? A. That is my impression.

Q. Now I want the cause of this. You swear under oath that your sales were from twenty to thirty a day; did you not then offer an inducement for other stores to come in and get part of your liquor business: were you not responsible for that? A. I don't believe I was.

Q. Do you think that the one dollar license ever contemplated twenty, thirty or forty sales a day? A. The question was never brought up in those days.

Q. How much of your sales are liquor, do you think? About one-third.

Under absolute prohibition, so far as any law can prohibit, or under any license law, a very small per cent. of such cases as I have quoted, in the present and growing temperance efforts, will surely smirch *every* drug store, and if, as is often true in "self defence," as it is termed, the small per cent. gradually grows, a fearful *scar* is sure to follow. Cut rates, tablet-triturates, pharmaceutical specialties, general prostration and department stores, have all had their influence in making the sale of intoxicating liquor at the drug store a serious and alarming problem. To my own mind, there is no question or problem more important to the present and coming pharmacist, that should be wisely solved, than Query 5; and from a careful consideration of all the facts bearing upon this question, so far as Massachusetts is concerned, I am forced to the conclusion that either the reputable pharmacist or the saloon drug store must go. Which shall it be? I do not believe the present condition can exist ten years longer.

The recent Raines bill of New York, making the drug store license \$100 in the city and grading downwards in smaller places, is certainly an indication of the trend of popular feeling regarding the sale of liquor for other than medicinal purposes in the drug store.

That there are some who believe this evil may be weeded out by wise legislation, and the drug store again assume its proper position, is apparent from the comments of the press in Massachusetts where an attempt has been made. I quote the following :

(Boston Journal, April, 1896.)

#### DRAM-SELLING DRUGGISTS.

"The House made a mistake which we hope to see corrected in refusing to reject the bill which proposes to repeal the Act of 1894 requiring a certificate from the State Board of Pharmacy as a condition to the issue of a sixth class liquor license. The committee had reported against the bill, but the House, by a vote of 61 to 82, refused to reject it, and substituted it for the committee's report. It will be noticed that the vote was taken in a thin House, and that the majority included only about one-third of the entire membership.

"It would be a mischievous thing to repeal the Act of 1894. The purpose of that act was to weed out some of the drug stores which have sprung up, chiefly in communities which vote against the licensing of saloons, for the carrying on of a disguised liquor business. The measure was designed not less for the protection of reputable pharmacists than for the good of the community, for the dram-selling druggist is a disgrace to an honorable vocation and brings it into disrepute. The board of pharmacy has administered the law with prudence and impartiality, but also with fearlessness, and a number of drug stores which have been doing a thriving liquor business have been refused a certificate by the board.

"It is inevitable that the druggists who have been weeded out should have but a poor opinion of the process by which it was done and the board commissioned to do it. It is possible to make quite a hue and cry by charges of favoritism or oppression. But all these matters were fully investigated by the committee, and the amplest opportunity was given for the presentation of all grievances. The report against the proposition to repeal the law was made after careful deliberation.

"All things considered, the dram-selling druggist is perhaps the most despicable of all violators of the liquor law. He is intrusted with a license for the nominal sum of one dollar, because it is deemed essential that there should be places where liquor can be had for medicinal purposes. He makes the selling of drugs only a pretext, and under cover of it does a promiscuous and irresponsible liquor business. We do not believe that, on reflection, the House will be disposed to relax any of the existing restrictions upon this kind of traffic."

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(Boston Traveler, April 16, 1896.) "The liquor license law, so far as it affects the druggists of the State, brought forth a very lively debate in the Legislature yesterday. Mr. Dow of Lawrence was the first to get the floor. He felt that the present bill was simply to aid the rumrunner in his deadly work. There was plenty of rum now being sold in the Commonwealth and the rumrunners had legislation enough, without being able to parade as druggists if the present bill before the House became a law.

"Mr. Withington, of North Easton, sincerely protested against the passage of the bill, which, if it became a law, would be a disgrace to the state. The bill, he said, is rotten to the core, and as a pharmacist, he protested against its passage.

"Mr. Tolman, of Pittsfield, in a very hot speech, gave the 'big three czars' on the Pharmacy Commission a toasting 'To my mind,' he said, 'a drug store is the proper place for us to go if we desire to purchase liquor for medicinal purposes. It is a pretty good place to go if one is ill and is in need of a drop of whiskey. I know that among the members of the House many a fine bottle of old Medford rum is owned. Therefore it, is but fair that we



should look on this question in the most liberal kind of way. Let us give the other fellow the same kind of freedom which we like for ourselves.'

"Mr. Manchester of Winchester, in the name of the temperance people and of every city or town voting no license, protested against the passage of a law which would make the majority of drug stores nothing more or less than rum holes. He did not believe the Legislature, which was as a whole in favor of temperance legislation, would be carried away with any howl or shrieks regarding the 'three czars.'

"Mr. Stevens of Dracut said, 'Revenge is stamped upon his spear and blood is his battle cry,' when he spoke of the efforts of the disgruntled druggists to get even with the so-called czars of the pharmacy commission who did nothing but their duty. 'If a man wants a drink, let him go to the public bar room, and not sneak into the back room of a drug store to drink it like a hypocrite.'

"At this point, when Mr. Stevens had worked himself up to a great pitch of excitement, Col. Young of Springfield interrupted with a question, 'Will the member tell us where he gets his liquor?' 'I don't drink it in secret,' retorted Mr. Stevens, 'and never in my life have I taken a drink in either bar room or drug store. I wonder if the gentleman from Springfield can say as much?'

(Boston Journal, April, 1896.) "There is an overwhelming array of evidence of the service to the commonwealth already rendered by the board of pharmacy, and the reasons are conclusive for the extension of this service by the judicious increase of power asked for in its latest annual report.

"The extension of the dram-selling business under a drug store mask has been a curse to the state. It is a notorious fact that hundreds of new drug stores were opened for the sole object of the gain from indiscriminate liquor selling under the sixth-class dollar license. There was wide-spread imposition and fraud in the masquerading of ignoramuses, quacks and barkeepers as pharmacists. It was to check and suppress this alarming spread of the liquor-selling curse, as well as to protect the people from the reckless and ignorant dispensing of drugs and poisons, that the board of registration in pharmacy was established in 1885. As the evidence of its service grew more and more apparent as the years went by, so, too, did the need of further upholding its hands in the effort to suppress the illegal sale of liquor behind the sign of the mortar and pestle.

"So, in 1893, stringent legislation was enacted, giving to the board the power to suspend or revoke certificates of registration in pharmacy. This power has been firmly and rightly used. With good cause further power was given in 1894 by the act which requires a certificate of fitness from the board before an applicant is eligible to receive a liquor-selling license. This was one of the best laws of the session, and with the authority thus conferred, the board has done great work in suppressing the abuse of license. During the past year 287 out of 1282 applications for license have been refused for sufficient cause, and more than 100 rum drug stores have been closed for good. With all due respect to our boards of police, mayors, aldermen, selectmen, overseers of the poor, and constables, we question the uniformity and carefulness of the examinations which they are authorized to make, and we doubt their competency to determine whether sales of liquor are made for medicinal use or to gratify the drunkard's thirst."

(Boston Transcript, April 24, 1896.) "The sober second thought of the House asserted itself to-day, when the bill to take from the board of pharmacy the power to say what pharmacists are suitable persons to have liquor licenses, which on a previous day had been ordered to a third reading by a vote of 90 to 75, was refused engrossment by a vote of nearly two to one. It is because there is so much money in the selling of liquor by men who are in the drug business for the especial purpose, that the opposition to the Board of Pharmacy has attained such large proportions; and whatever may have been Mr. Young's motives in presenting this bill, there can be no doubt that its passage would

have gladdened the hearts of all who are in the business for the dispensing of drinks rather than drugs."

I have no purpose or desire to pose as a leader, originator, or instigator of the movement or plan to place upon a pharmacy board such a law as we have in Massachusetts. To Mr. S. A. D. Sheppard, the able treasurer of this Association, belongs the credit of formulating the law and pushing it through to enactment. "No license of the sixth class shall hereafter be granted to any person who is not a registered pharmacist, actively engaged in business on his own account; nor to any such registered pharmacist unless he shall present a certificate from the state board of registration in pharmacy stating that, in the judgment of said board, he is a proper person to be entrusted with such a license and that the public good will be promoted by the granting of said license."

The Massachusetts board consists of five pharmacists who have decided and fixed opinions as to official duties and are not inclined to mere perfunctory work. The result of the past year's work was the refusing of nearly one-fourth of the applications for the liquor certificate, and the absolute closing of 103 so-called drug stores. Possibly the action was in advance of the popular sentiment, otherwise the violent opposition to the law and the board would have been silenced, as it could easily have been done by the reputable pharmacists of the State. The opponents of the law, made up largely of those whose applications had been refused, and marshaled by one who gave more than ninety days special work, aided by three prominent lawyers, one College of Pharmacy lecturer on law, and at a cost of many thousand dollars, succeeded in creating such a disturbance, personal abuse and antagonism of the board, as to make life almost a burden; failing, however, to secure the repeal of the law or change the personnel of the board, they did succeed in holding up the appropriation for the board for many months.

This is almost always the fate of those who attack the liquor question or work for any moral reform or suppression of vice.

That the law formulated by Mr. Sheppard, placing the duty of enforcement upon the pharmacy board, is the wisest and best plan, I am not prepared to say.

So far as it has been possible for me to formulate an opinion, I feel warranted in the statement that twenty to twenty-five per cent. of the drug stores, not only of Massachusetts but in many states, are in the drug business chiefly for the purpose of selling rum—without that privilege they would be forced to close their doors. I am also led to the conclusion that another large per cent. of the druggists have, as they honestly felt, been compelled to follow the degrading, despicable and demoralizing action of the first twenty per cent. or suffer the loss of many valued patrons. The remaining and greater per cent. I have no hesitation in declaring are honest, reputable, law-abiding citizens, with a standard of morals, integrity

and loyal service to their State and clients surpassed by none and equaled by few if any engaged in mercantile or professional work.

With these conditions and facts existing, and I submit they are such, very briefly and feebly presented, what should earnest, honest men, such as we claim to be, do in this day of our adversity and need? What did the signers of the Declaration of Independence do? What did Washington, Sumner, Lincoln, Grant, and many others do? Surely they did not cry peace when there was no peace. They and all men who recognize their rights and trusting in God, fought for them, not one year but many. What shall we do? I fear there may be an Arnold, a Judas, who for thirty pieces of debased silver would sell us out and be content with a burial in a potter's field; but I cannot and will not believe the members of the American Pharmaceutical Association will submit to the tyranny and sure destruction which would follow the quietly giving up of our rights and privileges upon the insolent demand of the saloon druggist and cutter, who says practically, "Your business or your life," or in Western parlance, "Git or dangle."

There is much that can be said in favor of prohibiting the sale absolutely in every drug store, and many times I have been so discouraged, annoyed and disgusted by the frequent assertion that reform and control are impossibilities, that it seemed a mere waste of time and labor to contend for restrictive legislation, when among our strong opponents we could count many reputable pharmacists, honest legislators and earnest temperance people. As a matter purely of financial importance, I at once agree it is not worth the effort it will cost to retain it. As a nuisance and demoralizing agency, demanding much care, caution and judgment, attended with great hazard of reputation, I also agree. But upon the principle of a right and positive duty to supply all medicinal remedies, I insist we should not hesitate to declare our position.

One condition must not be forgotten. Whatever evil, criminal, moral or social exists, there are, like the occasional breezes of an autumnal day causing the leaves to drop, the periodical disturbance of a village or city upon the several and varied existing evils; one day or one year the demand for reform is strong and emphatic; the next, like the warm wind from the South, the wave of public opinion has changed. The several factions muster their adherents and concentrate their forces with the slogan on this question as follows:

#### REPUTABLE PHARMACY VS. RUM PHARMACY.

"No license to druggists, who are more dangerous than the gilded saloon." "Confine the sale of liquor absolutely to the drug store; treat it as a medicine; close all other drinking places." These and other positions are now taken, and the strife continues, variable, unsettled, disturbing, and we the unhappy victims.

It has ever been thus as seen in the history of nearly all reforms. To-day upon this question there is a wide divergence of opinion as to the evil or remedy. Time, as in all such cases, will surely unite and determine what is wisest and best, what the people demand. It is idle to expect great progress in advance of public opinion. Upon which side of this question should we as pharmacists stand, is the highest point for us to determine. Our united, well defined position and action will be a great power in settling this matter. Let it be wise.

On motion of Dr. Stewart, it was ordered that a copy of Mr. Whitney's paper be sent to the Section on Pharmacy, Materia Medica and Therapeutics of the American Medical Association.

The next paper was presented by Mr. Watson, and on motion of Mr. Alpers the same was received and referred for publication.

#### PRACTICE VERSUS THEORY.

BY S. P. WATSON.

The interesting question which has been held before the Association for a number of years, as to whether drug store experience should be required by the various colleges throughout the country before granting their degree, is one which has been argued mainly by the representatives of the colleges, and those having a business interest in the success of the colleges and universities, while, strange to say, the practical pharmacist in business has been content to watch the controversy without apparently taking much interest in the issue. This remarkable indifference to his best interests has many parallels; we all know that the rank and file of the drug trade have done little or nothing to effectively save their business from disintegration and disaster by the attacks of the cutter and interloper; and now we find the druggist quietly submitting to another onslaught from the smaller universities and colleges throughout the country, who are educating a class of men whom they graduate without having one day's experience in a drug store. If this is permitted to go on without check, the outcome must be a serious one to the business interests of the retail druggist.

Coming into daily contact with a large number of retail druggists has afforded me many opportunities for observation, and it must be apparent to all that the best interests of the druggist and his assistant unquestionably lie in the direction of the colleges requiring drug store experience before graduation. I am not unmindful of the fact that the colleges and universities have pharmaceutical laboratories where instruction in the details of the shop is given, and it must be admitted that in some cases these laboratories are well equipped and have competent instructors; but it must also be admitted that the instruction afforded by the majority of these so-called laboratories is meager and delusive to the last degree—practical pharmacy being in most cases relegated to a back seat. The

student in pharmacy is taught how to analyze chemicals, assay drugs and preparations, and investigate chemically various substances ; but the graduates of such institutions as turned out are utterly unfitted to practice pharmacy, and are often ignorant of the simplest details in shop-work. To state that the result is disappointing to the graduate goes without saying ; but what shall be said of the retail druggist who employs such a misfit ? Of what use is he in making pills, folding powders, waiting on customers, meeting emergencies in shop practice, selling goods, and serving his employer, even though he be competent to investigate the chemical constituents of a plant or determine accurately the percentage of chloride in bromide ?

Do not understand me as underrating the value of such accomplishments in special cases, but let us look at the main question : he will have to put up a thousand prescriptions and perform a thousand shop duties before he is called upon once to use these accomplishments in which he may be *au fait*. Such an assistant naturally regards shop duties as beneath his ability, and soon regards his employer, who is unable to perform the apparently higher work, as a fossil ; and the employer on his part is soon glad to be rid of such an incumbrance, and to get in his place an assistant who can earn his salt. That the great majority of the retail drug trade will soon have their eyes opened there can be no doubt. The depressed condition and excessive competition of the business is compelling every one to practice business methods ; and the employment of a clerk experienced in shop duties is just as much of a good investment as is the purchase of goods at the lowest price. And how any considerable number of retail druggists throughout the country can employ assistants untrained in shop duties, is past my comprehension.

When the retail drug trade fully realize the true situation, they will see that their vital business interests lie in the direction of giving their clerks the best training in shop duties that their business affords, permitting them to acquire an education in some institution which insists upon drug store experience, and rigidly opposing an influx of competitors who, while possessing diplomas, are unable to cope with the simplest shop duties. The no-experience idea may serve to fill up the classes in the colleges, and cause each university throughout the country to start a department of pharmacy, employing the time of some of the professors of chemistry and other branches, whose time otherwise may not be wholly occupied, and it may succeed in deluding some students who may be led to believe that such a department of pharmacy will make them accomplished pharmacists ; but the truth must eventually prevail.

Let us have colleges of pharmacy run by druggists who know the needs of the whole profession (clerks as well as proprietors) ; let us have graduates fully equipped with knowledge of every business detail, which they can only get by shop training ; and when pharmacists regain and maintain

the control of their own heritage, a long pull, a strong pull, and a pull all together will crown their efforts with success.

The following paper was read in abstract by the author, and, on motion, received and referred to the Committee on Publication :

PHARMACY LAWS OF THE UNITED STATES—A COMPARATIVE EXHIBIT.

J. H. BEAL, SCIO, O.

Five of the territorial divisions of the United States are at the present time without pharmacy acts, though doubtless some of these districts have general laws which affect the calling of pharmacy more or less directly.

In the remaining portions of the Union there are 49 distinct pharmacy laws in operation, each administered by a different authority. Though a general resemblance may be traced in all of the laws, and a very close resemblance in a few, no two are exactly alike in all respects, and the divergence from the common type is in some cases extreme.

In the exhibit which follows no single scheme of classification has been rigidly adhered to, but it has been sought to collect the numerous provisions together under such heads as will bring out with the greatest clearness the various points of resemblance and difference. In other words, logical order has sometimes been sacrificed to convenience. Certain classes of provisions have not been deemed of sufficient importance to justify their inclusion in the exhibit, as for example, those relating to fines, and to the registration of persons in business at the time of the enactments of the several laws. Those of the first class are of local interest merely, while the provisions of the second class become obsolete after the first registration in each state.

It should be noted that the exhibit is intended more for the use of those who are interested in all of the laws than for those who may be interested in any particular one ; in other words, that its object is to enable one to determine conveniently and rapidly what States have or have not a given provision, and not to give extended information concerning any particular statute.

During the past year a series of papers similar in matter but different in form was printed by Prof. E. L. Patch, in the *Pharmaceutical Era*, but did not appear until the bulk of the present paper had been prepared. The author of this synopsis would cheerfully have spared himself the great labor involved in its preparation had he known that the work had already been undertaken by a person so competent as Prof. Patch.

On consideration it was decided not to include an exhibit of liquor legislation as related to pharmacy, partly for the reason that a complete set of such laws has not yet been collected, and also because of the already great length of the article.

A work of the present kind is especially liable to three classes of errors ; clerical errors due to the large number of separate items which must be

considered, errors of interpretation, and errors resulting from not having access to the latest enactments. While the author can not hope to have escaped any of these classes of mistakes, he has been at considerable pains to avoid them, and will be grateful for corrections where such are necessary.

#### STATES AND TERRITORIES WITHOUT PHARMACY LAWS.

Alaska, Arizona, Indian Territory, Indiana, Nevada.

#### STATES AND TERRITORIES HAVING PHARMACY LAWS.

All other states and territories not named above. Also District of Columbia, and separate laws for Erie County (Buffalo), N. Y., Kings County (Brooklyn), N. Y., and New York City.

#### TERRITORIAL APPLICATION.

In 37 instances the law applies territorially to the whole state or district in which it was enacted. Twelve acts, however, have only a limited or partial application, depending upon the distribution of the population. The laws of limited application are as follows :

*The Law Applies only to a Single City or County.*—Maryland (Baltimore) ; Kings County (Brooklyn), N. Y. ; Erie County (Buffalo), N. Y. ; New York City, N. Y.

*The Law Applies only to Incorporated Cities and Towns.*—Arkansas, Delaware. Tennessee.

*The Law Applies only to Towns of a Certain Population.*—Alabama : To towns of 900 or over, and within a radius of two miles. Florida : To towns of 200 or over, and within a radius of two miles. Kentucky : To towns of 1000 or more inhabitants. Montana : See exceptions in favor of general merchants. Texas : To towns of 1000 or more inhabitants.

#### PHARMACY LAWS CONTAINED IN CHARTERS OF STATE ASSOCIATIONS.

In three states the pharmacy law is found in the act of the legislature which incorporated the State Pharmaceutical Society. These are : North Carolina, South Carolina, South Dakota.

#### ARRANGEMENT OF SUBJECTS.

As a matter of convenience the provisions which receive consideration in this exhibit are arranged under the following heads :

1. The Boards of Pharmacy.
2. Licentiates and Registration.
3. Poison and Label Laws.
4. Adulterations. Sale of Drugs by Unqualified Persons. Miscellaneous Provisions.

# PART ONE—THE BOARDS OF PHARMACY.

## STYLE OR TITLE OF THE EXAMINING BOARD.

The usual statutory title is "Board of Pharmacy," or "Pharmacy Board," preceded or followed by the name of the state or district, but in the 15 laws given below a different title is official.

*The style is "Commissioners of Pharmacy."*—Connecticut, District of Columbia, Iowa, Maine, West Virginia, Wyoming.

*The style is "Board of Pharmaceutical Examiners."*—Mississippi, Oklahoma, South Carolina, South Dakota, Texas.

*Other styles.*—Maryland, "Commissioners of Pharmacy and Practical Chemistry;" New Hampshire, "Commission of Pharmacy and Practical Chemistry;" Massachusetts, "Board of Registration in Pharmacy;" Pennsylvania, "State Pharmaceutical Examining Board."

## NUMBER OF MEMBERS ON PHARMACY BOARDS.

The most popular number is 5, which is the number prescribed in 29 laws. Fifteen boards consist of 3 members. The highest number on any board is nine.

*Boards Composed of Five Members*—(All boards not enumerated below.)

*Boards Composed of Three Members.*—Alabama, Colorado, Connecticut, Idaho (1), Iowa, Maine, Maryland, Missouri, Montana, New Hampshire, North Dakota, South Dakota (2), Oklahoma, Texas (3), Wyoming.

(1) A separate board for each county.

(2) The Secretary and Treasurer of the State Association act as such for the State Board.

(3) A separate Board in each judicial district. "Not less than three members."

*Boards Composed of Some Other Number than 3 or 5.*—West Virginia, four members (at present time), one from each congressional district; South Carolina, six members; California, seven members; Rhode Island, seven members; Louisiana, nine members.

## METHODS OF SELECTING MEMBERS OF STATE BOARDS.

The most common method of selecting members on State Boards of Pharmacy is for the State Pharmaceutical Association to prepare a list of nominees, from which the Governor selects one person to fill the annually occurring vacancy.

In another large group of laws the Governor alone, or with the advice of his council, both nominates and appoints. Other methods of appointment are by colleges of pharmacy, by pharmaceutical associations, and by certain boards of public officers. In one case certain state officials are *ex officio* members of the Pharmacy Board.

*Appointed by the Governor, Nominated by the State Association.*—Colo-



rado, Connecticut, Delaware, Georgia, Illinois, Kansas, Kentucky, Minnesota, Montana, New Jersey, New York (State Board), North Dakota, Ohio, South Dakota, Tennessee, Virginia, Washington, Wisconsin.

*Nominated and Appointed by the Governor Alone.*—Alabama, Arkansas, California, Florida, Louisiana, Mississippi, New Mexico, Oklahoma, Oregon, Pennsylvania, Rhode Island, Vermont.

*Appointed by the Governor with Advice of Council or Senate.*—Iowa, Maine, Massachusetts (1), Michigan (2), Missouri (2), New Hampshire, Utah (3), Wyoming.

(1) Not more than one member from the same town.

(2) With consent of the Senate.

(3) Not more than two members from the same town.

*Special Methods of Appointment.*—District of Columbia: Appointed by the Commissioners of the District.

Erie County, N. Y. (Buffalo): Appointed by the County Judge from nominees of the Erie County Pharmaceutical Association.

Idaho: Appointed by the County Commissioners for each county.

Kings County, N. Y. (Brooklyn): Two members are elected by the County Pharmaceutical Association, and two by the County Medical Association. The four thus selected choose a fifth member.

Maryland (Baltimore): Nominated by the Maryland College of Pharmacy, appointed by the Governor.

Nebraska: The Attorney-General, Secretary of State, Auditor, Treasurer and Commissioner of Public Lands and Buildings constitute, *ex officio*, the "Board of Pharmacy," so called. These officials choose five practical pharmacists as a Board of "Secretaries" or "Examiners" to conduct the actual work of administering the law. The latter is the real Board of Pharmacy, in substance if not in title.

New York City: Elected by the New York College of Pharmacy.

North Carolina: Elected by the State Association. Commissioned by the Governor.

South Carolina: Elected by the State Association.

Texas: A separate Board in each judicial district, appointed by the presiding judge.

West Virginia: Appointed by the State Board of Public Works.

#### TERM OF OFFICE OF BOARD MEMBERS.

Usually the term of office is equal in years to the number of members composing the Board, *i. e.*, if the number of members is five, the term of office will be five years, etc., and so arranged that one term expires each year. By this plan the Board always has a majority of members experienced in the work of administering the law. In a few laws the term of office is not the same in years as the number of members on the Board, and all the members receive their appointment and their terms expire at

the same time. In one law the number of years in the term is equal to twice the number on the Board, so that one vacancy occurs every two years.

*Number of years in the term Equal to the Number of Members.*—(All boards not enumerated below.)

*Number of years in the term Not Equal to the Number of Members.*—Term four years: California, Florida, Louisiana.

Term three years: Kansas, Kings County, N. Y., New York City, Rhode Island.

Term two years: Colorado, District of Columbia, Maryland, Texas.

Mississippi: Term expires with that of the appointing Governor.

Nebraska: (Board of Examiners.) Indefinite, apparently five years.

Wyoming: Three members, term six years, one vacancy every two years.

#### QUALIFICATIONS OF BOARD MEMBERS.

In the majority of cases it is required merely that the board shall be composed of pharmacists, or "competent pharmacists." In quite a number of laws a certain term of experience is prescribed, ranging from three to ten years. In a few statutes certain other qualifications are required, as, that the members shall be graduates in medicine or pharmacy, etc.

*Required merely that the Members shall be Pharmacists.*—(All laws not enumerated below.)

*Members Shall Have Ten Years' Experience in Pharmacy.*—Colorado, Illinois,<sup>1</sup> Kansas, Michigan, Massachusetts, Montana (1), Ohio, Pennsylvania, Tennessee, Virginia.

(1) Less experience required of graduates in pharmacy.

*Members Shall Have Five Years' Experience in Pharmacy.*—Alabama, Arkansas, District of Columbia (1), Iowa, Missouri (2), Oklahoma (3), Utah, West Virginia, Wyoming.

(1) Or five years' experience in the practice of medicine.

(2) Shall not be connected with any school of pharmacy.

(3) Must not be users of intoxicants.

*Members Shall be Graduates in Pharmacy or Medicine.*—Delaware (1), District of Columbia (1), Idaho (4), Kings County, (N. Y.) (5), Montana (3), New York City (2).

(1) 3 Ph. G's. 2 M. D's.

(2) 3 M. D's. 2 Ph. G's.

(3) At least one Ph. G.

(4) Pharmacists or Physicians.

(5) Three Pharmacists and Two Physicians.

*Members Shall be Members of the State Association.*—North Carolina, North Dakota, South Dakota.

*Not Included in Above.*—Three years' experience: Georgia.

Four years' experience: Florida.

Seven years' experience: Nebraska. (Board of Examiners.)

Eight years' experience: New Mexico.

Shall be "Suitable Persons": Maine.

No Qualifications Prescribed: New Hampshire.

#### MEETINGS FOR HOLDING EXAMINATIONS.

As a rule the statute merely prescribes the minimum number of meetings to be held yearly, leaving the dates and places to the discretion of the board, and also expressly or impliedly giving the board authority to hold such additional meetings as it may think necessary. In 19 laws the minimum number of meetings is four annually, in 8 not less than two, in 6 not less than three, and in 5 at least one annually. In one state 5 meetings must be held in a year. In 9 the number of times as well as the places of the meetings are determined by the board, and in one by the State Association. In 12 states the place of one or more of the annual meetings is fixed by the law, and in 2 others it is specified that the meetings shall be held in different parts of the state.

*At Least Five Meetings Annually.*—Connecticut.

*At Least Four Meetings Annually.*—California, Delaware, Kansas (1), Minnesota, Nebraska (Board of Examiners), New Hampshire, New Jersey, New Mexico, New York City, Erie county, N. Y., Kings county, N. Y., New York (State), Oklahoma, Oregon, Pennsylvania, Utah, Vermont, Washington, Wisconsin.

(1) In different parts of the state.

*At Least Three Meetings Annually.*—Colorado, Massachusetts, Michigan, Ohio, South Carolina, Wyoming.

*At Least Two Meetings Annually.*—Arkansas (1), Idaho, Illinois, Kentucky, Mississippi, Montana (2), North Dakota (3), Rhode Island.

(1) Once at the yearly meeting of the state association.

(2) Not more than twice annually.

(3) Not more than four times annually.

*At Least Once Annually.*—Georgia, North Carolina, Tennessee, Texas, Virginia.

*Number and Place of Meetings Determined by the Board.*—Alabama, District of Columbia, Florida (1), Iowa, Louisiana, Maine, Maryland, Missouri, West Virginia.

(1) Meets whenever there are 10 or more applicants.

*Number and Place of Meetings Determined by the State Association.*—South Dakota.

*Places of Part or All of Meetings Specified in the Law.*—Arkansas (1), California (2), Connecticut (3), Illinois (4), Mississippi (3), New Jersey

(5), Ohio (6), South Carolina (3), Tennessee (7), Pennsylvania (3), Virginia (8), Vermont (8).

- (1) One meeting yearly at time and place of state association meeting.
- (2) Office at San Francisco.
- (3) At the state capitol.
- (4) Once at Chicago and once at Springfield yearly.
- (5) At Trenton.
- (6) One meeting yearly at each of the cities, Cleveland, Cincinnati, and Columbus.
- (7) One meeting at Nashville.
- (8) One meeting at the state capitol.

#### COMPENSATION OF MEMBERS OF PHARMACY BOARDS.

In the majority of cases the compensation is \$5 per day and actual expenses. In six laws the amount per day is \$3. In all cases where a per diem is allowed it is restricted to the number of days *actually employed in the service of the board*. In about 15 cases the statute either expressly states that the Board may distribute the receipts among its members, or warrants the assumption that this is intended. In six laws all compensation beyond expenses is expressly or impliedly prohibited.

*Members Allowed \$5 per day and Expenses.*—(All laws not enumerated below.)

*Members Allowed \$3 per day and Expenses.*—Idaho, Kansas, Michigan, Erie county, N. Y., Ohio, Vermont (1).

(1) If receipts are not sufficient, expenses are paid in full and balance pro rated among the members.

*Board Expressly or Impliedly Authorized to Distribute Receipts Among its Members.*—Arkansas, Georgia (1), Iowa (2), Kentucky, Louisiana, Maine, Maryland, Mississippi, Missouri, New Hampshire (3), New Mexico, New York (State), Rhode Island, Texas, West Virginia.

(1) All but \$600 from renewals and  $\frac{1}{2}$  of fines.

(2) \$2000 to board, balance to state.

(3) Apparently the members are to receive \$5 per day additional from the state treasury.

*Compensation Expressly Prohibited.*—Delaware (except expenses). District of Columbia (except expenses).

*Compensation Impliedly Prohibited by other Distribution of Revenue.*—Alabama: \$500 appropriated for expenses, surplus equally to State and State Pharmaceutical Association.

Florida: Same as Alabama.

Kings county, N. Y. (except secretary).

New York City (except secretary).

South Carolina.

*Members Receive an Annual Salary.*—Connecticut: \$300 and expenses, provided the fees received are sufficient for that purpose. If not, members pro rate receipts and the state bears expenses.

## SALARIES OF SECRETARIES.

In 18 statutes the board is authorized to fix the salary of the secretary, in one case it is fixed by the State Pharmaceutical Association, and in four cases it is determined by the statute itself. The subject is not referred to in the remaining statutes.

*Compensation of the Secretary fixed by the Board.*—California, Erie county, N. Y., Kentucky, Kings country, N. Y., Michigan, Minnesota (1), New York City, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Tennessee, Utah, Virginia, Washington, Wisconsin (2), Wyoming.

- (1) Secretary need not be a member of the board.
- (2) Neither secretary nor treasurer need be members of the board.

*Compensation of the Secretary fixed by the Statute.*—Connecticut, \$100 annually for clerical services; Colorado, not to exceed \$500 annually; Illinois, not to exceed \$2000 annually; Kansas, not to exceed \$600 annually; Montana, not to exceed \$150 annually.

*Compensation of Secretary Fixed by the State Association*—South Dakota.

## DISPOSITION OF SURPLUS REVENUE.

In 18 statutes no express statements are made as to the disposal of surplus revenue.

In 31 the surplus above current expenses is definitely disposed of.

In 14 statutes it is directed that the surplus shall be retained by the board as a contingent fund for the enforcement of the law.

In 7 the surplus goes to the State Pharmaceutical Association.

In 6 it is directed that it be paid into the State treasury.

In 2 the surplus is to be divided equally between the State and the State Association.

In one state the surplus is paid to a college of pharmacy, and in one to a county pharmaceutical association.

*Disposition of Surplus Revenue not Specified.*—(All statutes not enumerated below.)

*Surplus to be Retained as a Contingent Fund.*—Erie county, N. Y., Idaho, Illinois, Kansas, Minnesota, North Dakota, Ohio, Oregon, Pennsylvania, Tennessee, Utah, Washington, Wisconsin, Wyoming.

*Surplus to be Paid to the State Association.*—Colorado (1), Georgia (2), New Jersey, North Carolina, South Carolina (3), South Dakota (4), Virginia (5).

(1) All over \$300 paid to the Association and held by the latter as a fund for educational and scientific purposes.

(2) \$600 only to the State Association.

(3) Examination fees to the Association.

(4) All receipts to the treasurer of the State Association, who is also treasurer of the board.

(5) All in excess of \$100 paid to Association annually.

*Surplus paid into the State Treasury.*—California (1), Connecticut, Iowa (2), Michigan (1), Montana (3), Nebraska (1).

- (1) Held as contingent fund for use of the board.
- (2) All in excess of \$2000.
- (3) All in excess of \$300.

*Special Cases.*—Alabama : Surplus divided between State and State Association.

Florida : Surplus divided between State and State Association.

Kings county, N. Y. : Surplus for benefit of the County Pharmaceutical Society.

New York City : Surplus for benefit of New York College of Pharmacy.

#### DISPOSITION OF RECOVERED PENALTIES. .

In 20 laws no mention is made of the disposition of penalties recovered for violations of the statute. In such case the proper destination of the fines would be the public treasury. In 10 statutes it is provided that the recovered penalties shall be paid to the board of pharmacy, in 6 that they shall be divided between the board and the common school fund, in 3 to the school fund, and in the remainder to various sources.

*Disposition of Fines Not Expressly Stated.*—(All statutes not enumerated below.)

*Penalties Belong to the Pharmacy Board.*—California, Colorado, Illinois, Maryland, New Mexico, North Dakota, Pennsylvania, Tennessee (1), Utah, Wyoming.

- (1) For failure to expose certificate of registration.

*Penalties Belong to the School Fund.*—Arkansas, Montana (1), Ohio.

- (1) Penalties for violation of the adulteration clause.

*Divided Equally Between the Board and School Fund.*—Idaho, Iowa, Minnesota, Oregon, Washington, West Virginia.

*Divided Between the Board and the County or Prosecutor.*—Delaware (1), New Jersey (2), New York State (1), Rhode Island (2).

- (1) Between board and county.
- (2) Between board and prosecutor.

*Divided Between Board and State Treasury.*—Georgia, South Carolina, Virginia.

*Other Dispositions of Penalties.*—Connecticut : Divided equally between the prosecutor and the town.

Kings county, N. Y. : To King's County Pharmaceutical Society.

Maine : Divided between county treasury and the County Law Library.

New York City : To Library Fund of New York College of Pharmacy.

South Dakota : To the State Pharmaceutical Association.

## AUXILIARY BOARDS.

Three boards are given authority to create auxiliary boards : Alabama, Florida, Missouri.

## REPORTS OF BOARDS OF PHARMACY.

Sixteen laws do not specifically require the board of pharmacy to report to any authority, though it is likely that other state laws require at least an accounting for the money received and paid out. Thirteen laws require the board of pharmacy to make an annual report of its proceedings and of the condition of pharmacy to the Governor. Thirteen laws require a similar report to be made to the Governor and the State Pharmaceutical Association. Other laws require reports to the General Assembly, Secretary of State, etc.

*No Report Specifically Required.*—(All laws not enumerated below.)

*Report to be Made to Governor Only.*—California, Delaware, Kansas, Louisiana, Maine, Massachusetts, New Hampshire, New Mexico, Oregon, Pennsylvania, Utah, Virginia, Wyoming.

*Report to Governor and State Association.*—Colorado, Illinois, Kentucky, Michigan, Minnesota, Montana, New Jersey, New York (State) North Carolina, North Dakota, South Dakota, Washington, Wisconsin.

*Report Made to Other Authorities.*—Connecticut : Must account for money received to State Treasurer.

Georgia : Reports to State Association.

Idaho : To County Commissioners.

Nebraska (Board of Examiners) : To State Auditor and State Association.

Ohio : To State Association and Secretary of State.

Rhode Island : To the General Assembly.

South Carolina : State Association reports to the General Assembly.

Tennessee : Same as Ohio.

## PART TWO.—LICENTIATES AND REGISTRATION.

## GRADES AND TITLES OF LICENTIATES.

In 28 laws two grades of licentiates are provided for, the first or higher grade being that of proprietor or responsible head of a pharmacy, and a second or lower grade for one who is not permitted to conduct a place of business in his own name, but to occupy a subordinate position under a manager, or to have charge in the temporary absence of the latter.

In 20 laws but one grade of licentiate is recognized, which is, of course, that of manager or proprietor.

The usual statutory titles are Registered Pharmacist and Registered Assistant Pharmacist for the first and second grades respectively.

In one State a third grade is recognized, known as Registered Apprentice. In some cases special titles are used, as, in Texas, Qualified Pharmacist and Qualified Assistant ; in Connecticut, Licensed Pharmacist ; in

Maine, Registered Apothecary; in Delaware, Registered Proprietor or Manager, etc.

*States Having Two Grades of Licentiates.*—(All laws not enumerated below.)

*States Having One Grade of Licentiate.*—Alabama, Arkansas, Connecticut, District of Columbia, Florida, Georgia, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Mississippi, Missouri, Nebraska (1), New Mexico, New York City, North Carolina, South Carolina, West Virginia, Wyoming (1).

(1) Present law does not provide for registration of assistants.

*States Having Three Grades of Licentiates.*—Illinois: Registered Pharmacist, Registered Assistant, and Registered Apprentice.

# AGE AND EXPERIENCE REQUIREMENTS.

In 12 laws neither age nor experience qualifications are prescribed for licentiates. In 11 laws both age and experience qualifications are required of all licentiates. In the remaining cases the usage is various, some laws prescribing age but no experience, others fixing the experience but silent as to age, and others again which fix the age or experience, or both, for one grade or licentiate but not for another. It should be remembered that only the provisions of the law are given here. The boards of the several States may have rules of their own upon subjects regarding which the law is silent.

*Neither Age Nor Experience Specified.*—Alabama, Arkansas, Florida, Iowa, Massachusetts, Mississippi, Missouri, New Mexico, Ohio, South Carolina, Tennessee, West Virginia.

*Both Age and Experience Required of Licentiates.*—

	Age.		Experience, years.	
	R. P.	A. P.	R. P.	A. P.
Colorado .....	21	18	4	2
District of Columbia.....	21		4	
Illinois (except Apprentices) .....	21	18	4	3
Kentucky .....	18		3	
Minnesota .....	21	18	4	2
Montana .....	21	18	4	1
Nebraska .....	18		3	
New Jersey.....	21	18	4	3
South Dakota.....	18	18	3 (1)	2
Virginia.....	21	18	4	2
Wisconsin .....	21	18	5 (2)	2

(1) Graduates in Pharmacy of the South Dakota Agricultural College are required to have but one years' experience.

(2) Graduates in Pharmacy of the University of Wisconsin and like institutions are required to have but two years' experience.

NOTE: Blanks in A. P. column indicate that such states do not recognize the grade of Assistant.



*Age Only Specified for Both Grades.—*

	R. P.	A. P.
Michigan .....	18	16

*Experience Only Specified for Both Grades.—*

	Years.	
	R. P.	A. P.
Connecticut .....	3	
Delaware .....	3	3
Georgia .....	3	
Idaho .....	2	2
Kansas .....	4	2
Maryland .....	2	
Erie county, N. Y. ....	4	3
New York City .....	4	2
New York, State .....	4	2
Pennsylvania .....	4	2
Wyoming .....	2	

NOTE : Connecticut, Georgia and Wyoming do not have A. P. grade.

*Age and Experience Required of Assistants Only.—*

	Age.	Experience.
New Hampshire .....	18	2
Oregon .....	18	2

*Age and Experience Required of Pharmacist Only.—*

	Age.	Experience.
Vermont .....	21	3

*States not Included in Preceding Classes—Requirements Irregular.—*

	Age, years.		Experience, years.	
	R. P.	A. P.	R. P.	A. P.
California .....	—	18	4	2
Delaware .....	—	18	3	3
Maine .....	—	18	3	2
Kings county, N. Y. ....	—	—	4	—
North Carolina .....	—	—	3	—
North Dakota .....	—	18	4	2
Oklahoma .....	21	18	—	2
Rhode Island .....	—	—	—	3
Texas .....	21	21	—	2
Utah .....	18	—	4	2
Washington .....	—	18	3	3
Louisiana .....	21	—	4	—

## SPECIAL PROVISIONS RESPECTING EXPERIENCE REQUIREMENT.

*Time of Attendance at College of Pharmacy Deducted from Required Time of Experience.*—Illinois (1), Maryland (2), Washington (1).

(1) Assistants only.

(2) Persons having attended one full course of lectures at College of Pharmacy may dispense drugs without immediate oversight of Registered Pharmacist.

*Experience not Required of Graduates in Medicine and Pharmacy.*—Connecticut (1), District of Columbia (2), Illinois (2), Maine, South Dakota (3), Wisconsin (4).

(1) Only Graduates in Pharmacy excused from experience.

(2) Only Graduates in Medicine excused from experience. In Illinois physicians must have four years' experience in filling their own prescriptions.

(3) Graduates in Medicine excused from all experience. Graduates in Pharmacy of South Dakota Agricultural College need have but one year's experience.

(4) Graduates in Pharmacy of University of Wisconsin and of like institutions need have but 2 years' experience.

#### REGISTRATION WITHOUT EXAMINATION.

In 9 laws the only method of becoming registered is by sustaining a successful examination before the Board of Pharmacy, no diploma or other certificate being accepted in lieu of examination.

In the remaining laws registration without examination is permitted to one or more classes of persons. These are as follows :

On Diplomas of Colleges of Pharmacy which require a certain period of experience before graduation.

To Graduates in Pharmacy who have had a certain period of experience either before or after graduation.

On Diplomas of Colleges of Pharmacy recognized as legitimate by the Board, no mention being made of experience.

On Diplomas of Colleges of Medicine.

On Certificate of Registration granted by some other Board of Pharmacy.

On proof of a certain period of experience in pharmacy by the candidate for registration.

#### *On Diplomas of Colleges of Pharmacy which Require Experience Before Graduation.*

*Four Years' Experience Required by the College.*—Alabama, District of Columbia, Florida, Iowa, Maryland, West Virginia.

*Three Years' Experience Required by the College.*—Arkansas, Kentucky (1), New Mexico.

(1) The privilege extended only to graduates of Kentucky colleges.

*Two Years' Experience Required by the College.*—Texas.

*On Diplomas of Colleges Approved by the Board. (Holder to Have Certain Term of Experience, either Before or After Graduation.)*

*Holder to Have Four Years' Experience.*—California, Colorado, Erie county, N. Y., Kings county, N. Y., Minnesota, New York City, Washington.

*Holder to Have Three Years' Experience.*—Utah.

*Holder to Have Two Years' Experience.*—Montana.

*On Diplomas of Colleges Approved by the Board. Experience not Specified.*

Idaho, Louisiana, Nebraska (1), North Carolina, North Dakota, Wyoming.

- (1) Temporary registration only.

*On Diplomas of "Reputable" or "Recognized" Colleges. Experience not Specified.*

Connecticut, Delaware, Kansas, Oklahoma, Oregon, Rhode Island, South Carolina, Vermont, Virginia (1).

- (1) Temporary registration only.

*On Medical Diplomas.*

Alabama, Delaware, Florida, Georgia (1), Kentucky, Kings county, N. Y., (3), Maine (2), Minnesota (3), Mississippi, New York City, North Carolina (4), South Carolina (5), Vermont, Virginia (6).

- (1) Physicians who graduated prior to 1887.
- (2) May practice pharmacy without even registering.
- (3) Must have four years' experience in pharmacy.
- (4) In towns of 800 inhabitants or less.
- (5) In towns of 300 inhabitants or less.
- (6) In towns of 1500 inhabitants or less.

*On License of Another Board.*

Connecticut (1), Erie county, N. Y., Idaho, Illinois, Kings county, N. Y., (2), Louisiana, Michigan, Minnesota, New York City, New York, State (3), Nebraska (4), North Carolina, North Dakota, Oklahoma, Oregon, South Dakota, Vermont, Virginia (4), Washington, Wyoming.

- (1) On a license granted within one year.
- (2) Must have four years' experience in pharmacy.
- (3) On license of any other New York board.
- (4) Temporary registration only.

*On Experience Only.*

California (1), Delaware (2), Idaho (3), Illinois (4), Louisiana (5), Nebraska (6), North Dakota (7), Rhode Island (8), Vermont (?), New York, State (10), Washington (9).

(1) Persons who have had four years' experience and "present satisfactory credentials of their attainments."

- (2) As Assistants on three years' experience.
- (3) In towns of less than 500 on 2 years' experience. See Permits.
- (4) Persons 21 years of age and 5 years' experience may register for one locality only. Assistants on 3 years' experience, college attendance deducted.
- (5) Persons with 4 years' tuition under a registered pharmacist.
- (6) Assistants registered for two years may register as pharmacists without examination.

- (7) As Assistant only.
- (8) Registered Assistants may be registered as Registered Pharmacists at option of board.
- (9) As assistant only on 3 years' experience, attendance at college deducted.
- (10) Persons who were entitled to register in 1884.

*Applicants for Registration Must be of Temperate Habits.*

Illinois, Kansas, Michigan, Nebraska, Oklahoma, South Dakota, West Virginia.

TEMPORARY REGISTRATION.

In 8 laws provision is made whereby between examinations certain persons, presumably competent, may be granted temporary certificates permitting them to engage in pharmacy until the next succeeding meeting of the Board of Pharmacy. A small fee is usually charged.

Arkansas (1), Mississippi, Nebraska (2), New Mexico, South Dakota, Texas, Vermont, Virginia (2).

- (1) Fee \$2, deducted from examination fee.
- (2) Only Graduates in Pharmacy and Licentiates of other boards may thus register.

MINOR CERTIFICATES AND SPECIAL PERMITS.

In 7 statutes the sale of drugs in country districts is brought within the control of the Boards of Pharmacy by giving them the power to issue minor certificates or special permits to suitable persons in such localities. A small fee is usually required.

*Idaho.*—In towns of 500 minor certificates may be issued to persons of two years' experience. Holder of this certificate may register as an assistant in larger places.

*Illinois.*—Board may issue to unlicensed persons permits to sell such articles as they may prescribe. Fee \$1. Annual renewal 50 cents.

*Kansas.*—Where there is no registered pharmacist within 5 miles, merchants may be licensed to sell usual domestic remedies, not poisons. \$2.50 annually.

*New Mexico.*—Where there is no Registered Pharmacist, minor certificates may be granted to merchants to sell such medicines, compounds and chemicals as the general public may require. No fee prescribed.

*Rhode Island.*—Where there is no Registered Pharmacist within 3 miles, board may grant permit to suitable persons to sell usual domestic remedies, when put up and labeled by Registered Pharmacist. Fee \$1 annually.

*South Carolina.*—In places of less than 300, where there is no Registered Pharmacist, board may grant special license to physicians. Fee \$5.

*Wisconsin.*—In towns of 500 or less, assistant pharmacists may have charge of a store.

## FEES FOR EXAMINATION AND REGISTRATION, AND RENEWALS.

*Blanks in A. P. column indicate that the grade is not recognized.*

	Registration.			Period.	Renewals.	
	By Examination.		Without Examination.		R. P.	A. P.
	R. P.	A. P.	R. P.			
Alabama. ....	\$3.00		\$2.00			
Arkansas. ....	6.00		3.00			
California. ....	5.00	\$2.00		Annual.	\$2.00	\$1.00
Colorado. ...	5.00	5.00	5.00	Annual.	2.00	2.00
Connecticut. ....	5.00		3.00	Annual.	2.00	
Delaware. ....	5.00	5.00	1.00			
District of Columbia.	10.00		3.00			
Erie County, N. Y..	7.00	5.00	5.00			
Florida. ....	3.00		2.00			
Georgia. ....	5.00			Annual.	2.00	
Idaho. ....	10.00	10.00 (?)	5.00	Annual.	5.00	1.00 (?)
Illinois. ...	5.00	5.00	5.00	Annual.	1.50	1.00
Iowa. ....	5.00		2.00	Annual.	1.00	
Kansas. ....	5.00	3.00	2.00 (?)	Annual.	(1)	(1)
Kentucky. ....	5.00		5.00	Annual.	.50 (2)	
Kings County, N. Y.	7.00 (?)	6.00 (?)	2.00			
Louisiana. ....	8.00		3.00			
Maine. ....	10.00	5.00				
Maryland. ....	6.00		1.00	Annual.	1.00	
Massachusetts. ....	5.00					
Michigan. ....	3.00	1.00	2.00	Annual.	1.00	.50
Minnesota. ....	5.00	5.00	2.00	Annual.	2.00	1.00
Mississippi. ....	5.00					
Missouri. ....	3.00					
Montana. ....	5.00	1.00	5.00	Annual.	2.00	2.00
Nebraska. ....	5.00			Annual.	2.00	
New Hampshire. ....	5.00	2.00				
New Jersey. ....	10.00	5.00		Triennial.	.50	.50
New Mexico. ....	5.00		2.00	Annual.	(3)	(3)
New York, City. ....	7.00	6.00 (?)	2.00			
New York, State. ...	10.00	3.00	5.00			
North Carolina. ....	7.00		2.00	Annual.	1.00	
North Dakota. ....	5.00 (5)		3.00	Annual.	3.00 (4)	.50
Ohio. ....	3.00	2.00		Triennial.	1.00	.50
Oklahoma. ....	5.00	5.00 (?)	3.00	Annual.	(1)	(1)
Oregon. ....	5.00	5.00	5.00 (?)	Annual.	1.00	.50
Pennsylvania. ....	3.00	3.00		Triennial.	3.00	3.00
Rhode Island. ....	10.00	(?)	(?)	Annual.	1.00	1.00
South Carolina. ....	10.00		5.00	Annual.	1.00	
South Dakota. ....	5.00	5.00		Annual.	5.00	5.00
Tennessee. ....	5.00	3.00		Annual.	1.00	.50
Texas. ....	5.00	5.00 (?)	3.00			
Utah. ....	5.00	5.00	3.00	Biennial.	2.00	1.00
Vermont. ....	5.00	5.00	1.00			

	Registration.			Renewals.		
	By Examination.		Without Examination. R. P.	Period.	R. P.	A. P.
	R. P.	A. P.				
Virginia .....	5.00	5.00		Annual.	1.00	1.00
Washington .....	5.00	5.00	3.00	Annual.	2.00	1.00
West Virginia .....	5.00		2.00			
Wisconsin .....	5.00	5.00		Annual.	2.00	2.00
Wyoming .....	10.00		3.00	Annual.	2.00	1.50

(1) No fee for renewal if made promptly. For failure to renew until notified by Secretary, the licentiate must pay a fee of fifty cents. Then, if renewal is not made in 30 days the name is dropped from the roll, and can be restored only on payment of \$5.

(2) Recorded annually with clerk of county court.

(3) No fee specified for renewal.

(4) Renewal fee includes annual dues in State Association.

(5) Includes membership in State Association.

#### SPECIAL RECORD OF LICENSE REQUIRED.

In 5 states it is necessary for the holder of a license from the board to have the same recorded in another office, for which an extra fee is usually charged.

Georgia: With ordinary of the County. Fee 50 cents.

Kentucky: In County Court, annually. Fee 50 cents.

Mississippi: In Circuit Court.

Missouri: In County Court. Fee 50 cents.

Vermont: With Secretary of State. Fee 25 cents.

#### REVOCATION OF REGISTRATION.

In 35 states provision is made for the revocation of the certificates of licentiates for one or more specified causes. In 19 laws registration is revoked by conviction for adulteration, in 7 for violation of the liquor law, in 9 for failure to renew registration within a certain period, in 3 for retirement from the pursuit of pharmacy for a certain period, in 4 for habits of intemperance or use of narcotics, in 3 for any conviction for violating the pharmacy act, in 1 for conviction of any crime involving moral turpitude. Also in 5 for just and sufficient cause, in 2 for incompetency, in one for second conviction for violation of the poison and label law, in 2 for change of location without notification to the board, in 2 for failure to expose certificate of registration, and in 15 for obtaining registration by fraud.

*Conviction for Adulteration Cause for Revocation.*—Alabama, Arkansas, District of Columbia, Florida, Idaho, Iowa, Kansas, Kings County, N. Y., Minnesota, Missouri, New Mexico, New York City, North Carolina, Oregon, Rhode Island, Tennessee, Virginia, West Virginia, Wisconsin.

*Illegal Sale of Liquor Cause for Revocation.*—Arkansas, Iowa (1),

Kansas, Massachusetts (2), Missouri (3), North Dakota, West Virginia, (3).

- (1) For repeated violations.
- (2) One year for first offense.
- (3) For second offense.

*For Failure to Renew Within Certain Period.*—Colorado, (1), Kansas, (1), Michigan, (2), Montana, (3), Nebraska, Rhode Island (4), South Dakota, (6), Tennessee, (1), Wisconsin, (5).

- (1) For failure to renew within 30 days after receipt of notice from Secretary.
- (2) For failure to renew within 10 days after receipt of notice from Secretary.
- (3) For failure to renew within 6 months of annual period.
- (4) For failure to renew by July 1st of each year.
- (5) For failure to renew within 60 days after second notice from Secretary.
- (6) For failure to renew within a year.

*For Habits of Intoxication or Use of Narcotics.*—Illinois, Kansas, New Jersey, North Dakota.

*For Retirement from Business.*—Arkansas, (1), New Mexico, (1), Wyoming (2).

- (1) For 12 months.
- (2) For 3 years.

*For Any Conviction for Violation of the Pharmacy Act.*—Connecticut, West Virginia, New Jersey (1).

- (1) Also for conviction of any crime involving moral turpitude.

*For Good and Sufficient Cause.*—Kings County, N. Y., New York State, Nebraska, Rhode Island, Vermont.

*For Change of Location Without Notice to the Board.*—North Dakota, Rhode Island.

*For Incompetency.*—North Dakota, South Dakota.

*For Failure to Expose Certificate of Registration.*—Oklahoma (1), Texas.

- (1) Also for second conviction for violating poison and label law.

*For Obtaining Registration by Fraud.*—Alabama, Arkansas, District of Columbia, Erie County, N. Y., Florida, Iowa, Kansas, Michigan, Minnesota, (1), Missouri, Nebraska, New Mexico, Oklahoma, Oregon, Texas.

- (1) Also for failure to pay fines assessed under the pharmacy act.

#### EXPOSURE OF CERTIFICATE OF REGISTRATION.

Thirty-four laws require that the certificate of registration shall be conspicuously exposed in the place of business of the holder. 16 laws do not make this requirement.

*Exposure of Certificate Not Required.*—(All laws not enumerated below).

*Certificates Must be Conspicuously Exposed.*—Alabama, Arkansas, Colorado, Connecticut, Erie County, N. Y., Florida, Idaho, Illinois, Iowa, Kansas, Kings County, N. Y., Massachusetts, Michigan, Minnesota, Montana, New Mexico, New York State, Nebraska, New Jersey, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming.

#### EXEMPTION FROM JURY DUTY.

In 10 States, possibly in others, also, persons registered under the pharmacy act are expressly exempted from jury duty: Arkansas, California, Colorado, Michigan, (senior pharmacist only), Minnesota, Nebraska, New Mexico, New York, entire State, North Carolina, Wyoming.

#### FRAUDULENT USE OF THE TITLE OF REGISTERED PHARMACIST.

In 23 laws the fraudulent use of the title of Registered Pharmacist, or falsely claiming to be registered, is prohibited under penalty. This provision is found in the following laws: Alabama, Arkansas, California, Colorado, Florida, Idaho, Iowa, Kentucky, Kings County, N. Y., Missouri, Montana, New Jersey, New Mexico, New York City, North Carolina, North Dakota, Oregon, Rhode Island, South Dakota, Utah, Washington, West Virginia, Wyoming.

#### PART THREE.—POISON AND LABEL LAWS.

Probably in no part of the laws relating to the practice of pharmacy is there such a lack of agreement as in the poison and label laws of the various states. This disagreement is so great that nothing like a complete account of their various provisions will be attempted in the present exhibit, but only a comparison of their more important features. For the text of the poison laws of Arkansas, Maine, New Hampshire, Tennessee, and Vermont the writer is indebted to the numbers of the *Pharmaceutical Era* for September, 1895.

#### STATES AND TERRITORIES WITHOUT POISON AND LABEL LAWS.

So far as the writer has been able to learn, the following eight States and Territories are entirely without legislation regulating the labeling and sale of poisons: Alaska, Arizona, Indiana, Indian Territory, Maryland, Nevada, New Mexico, (1), Texas.

(1) Reported to have a poison law, but the writer has not been able to obtain a copy.

To save needless repetition, the following general forms of poison and label laws are given, and are referred to by number under the States which have the same or similar provisions. Variations are noted under the laws in which they occur:



## GENERAL FORMS OF POISON AND LABEL LAW.

*Form No. 1.—Schedule A.*

Arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, red mercuric iodide, potassium cyanide, hydrocyanic acid, strychnine, and all other poisonous alkaloids and their salts, essential oil of bitter almonds, opium and its preparations, excepting paregoric, and other preparations of opium containing less than 2 grains to the ounce.

*Schedule B.*

Aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, digitalis, and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, zinc sulphate. mineral acids, carbolic acid and oxalic acid.

The articles contained in both schedules must be labeled, both on the container and on the outside wrapper, with the name of the article, the word "Poison," and the name and place of business of the seller. Nor may any such article be delivered until it has been ascertained that the purchaser is aware of its poisonous character and desires it for a legitimate use. In addition to the preceding, when any article in Schedule A. is sold an entry must be made in a book kept for that purpose, stating the date of the sale, the name and address of the purchaser, the name of the article, the purpose for which it is to be used, and the name of the dispenser. This record must be preserved for at least 5 years.

The requirements as to labeling and recording do not apply to poisons dispensed on physicians' prescriptions, when not in unusual quantities or doses.

*Form No. 2.*

The same as No. 1, except that all named poisons are embraced in one schedule, and that the recording of the circumstances of the sale is not necessary.

*The Poison Law Corresponds to Form 1, Except as Noted.—(See also Special Provisions.)*—California (1), District of Columbia, Erie County, N. Y. (2), Georgia, Iowa, Kansas (3), Kings County, N. Y., Missouri (4), New York City, North Carolina (5), North Dakota, Virginia (6), West Virginia (7).

(1) Schedule A. omits red and white precipitates, biniodide of mercury, and essential oil of almonds, and includes cocaine.

Schedule B. includes the articles omitted from A., also phosphorus, sugar of lead, and omits henbane, ergot, cotton root and creosote. Poison label not necessary if single package does not contain more than ordinary dose.

(2) Schedule A. omits red and white precipitate and red mercuric iodide. Schedule B. includes omitted articles and oil of tansy and lead acetate.

(3) Schedule A. includes chloroform and morphine. Schedule B. omits savin, ergot, cotton root and chloroform, and includes sugar of lead and "all other virulent poisons."

A third schedule C. is given which includes oils of savin and tansy, ergot and cotton root and preparations, and all other emmenagogues and abortives. The sale of every article in A. and B. must be recorded. Articles in Schedule C. may be sold only on prescription of qualified physician.

(4) Schedule A. omits corrosive sublimate, white and red precipitates, and opium and preparations. Schedule B. includes omitted articles and veratrum.

(5) Schedule A. omits opium and the words "all other poisonous alkaloids and their salts." Schedule B. includes opium and the words "all other poisons."

(6) Schedule A. omits white and red precipitate, opium and its preparations. Schedule B. includes articles omitted from A. and the words all other "deadly poisons," and omits by name zinc sulphate and mineral acids.

(7) Schedule B. includes lead acetate and copper sulphate.

*The Poison Law Corresponds to Form 2, except as Noted.*—Alabama (1), Florida (1), Idaho (2), Minnesota (3), Montana (4), New Jersey (5), Oklahoma (6), Oregon (7), Wisconsin (8), Utah (9), Wyoming (10).

(1) Veratrum added to the list.

(2) Omits colchicum, henbane, savin, ergot, cotton root, cantharides and mineral acids, and includes laudanum, morphine, sugar of lead, cocaine, and "any poison commonly recognized as such." Every sale must be recorded.

(3) Omits henbane, savin, ergot, cotton root, cantharides and mineral acids, and includes morphine, oil of tansy, sugar of lead, and "any poisons commonly recognized as such." The criminal code also gives a list of poisons which must be labeled and the sale recorded.

(4) Omits henbane, savin, ergot, cotton root, cantharides, and creosote.

(5) Omits colchicum, creosote, zinc sulphate, mineral acids, carbolic and oxalic acids, and includes oils of savin and tansy, and the words "any other substance commonly recognized as a deadly poison." See also "Special Provisions."

(6) All sales must be recorded.

(7) Omits red precipitate, mineral acids and words "all other poisonous alkaloids and their salts," and includes morphine, cocaine and their combinations and words "all other deadly poisons." All sales must be recorded as in Form No. 1.

(8) Includes morphine, oil of cloves, phosphorus, sulphuric ether, sugar of lead, and "any poison commonly recognized as such." All sales must be recorded as in Form No. 1.

(9) Same as Idaho, except cocaine.

(10) Omits cantharides, colchicum, cotton root, ergot, henbane, mineral acids and savin, and includes laudanum, morphine, sugar of lead, and "any poison commonly recognized as such." Sale must be recorded as in Form No. 1. May not be delivered to person under 15 years of age.

*Poison Laws Differing Materially from Forms 1 and 2.*—A number of laws give schedules differing so materially from Forms 1 and 2 that a satisfactory abstract can not be made without the use of greater space than is here available.

*The Schedules Include Most of Articles in Forms 1 and 2, with others. Recording and Labeling Substantially the Same.*—Colorado, Connecticut (1), Kentucky, Massachusetts, Rhode Island, South Carolina, Washington.

(1) But only the poisons named in the next following list need to be recorded.

*Only the More Violent Poisons Scheduled. Requirements of Labeling*

*Sometimes Omitted. All Sales Recorded Substantially as in Form 1.*—Arkansas (1), Connecticut (2), Delaware (3), Maine (5), New Hampshire (4), Vermont (6).

(1) Includes arsenic, strychnine, corrosive sublimate, nux vomica, prussic acid, croton oil, and preparations of opium containing more than 2 grains to the ounce. Must be labeled and sales recorded.

(2) Includes first three articles given for Arkansas and potassium cyanide. Must be labeled and sales recorded. A second larger schedule is given which must be labeled.

(3) Includes only arsenic, strychnine, and corrosive sublimate. Label not prescribed by the statute. Sale must be recorded.

(4) Includes first five articles given for Arkansas. Label not specified by statute.

(5) Same list as New Hampshire. Must be labeled poison.

(6) Same list as New Hampshire, and chloroform. Label not specified by statute.

*Every Package of Drugs, Medicines and Chemicals Must be Labeled.*—Illinois, Louisiana, New York (Entire State).

*Every Poisonous Substance Must be Labeled as Such, Prescriptions Excepted.*—Arkansas, Illinois (1), Louisiana (2), Michigan (3), Minnesota, Mississippi (4), Nebraska (4), New Jersey, New York (5), North Carolina, North Dakota (6), Ohio (7), Oregon (10), Pennsylvania (8), South Dakota (9), Tennessee (10), Utah, Wisconsin, Washington, Wyoming.

(1) Sales of arsenic, strychnine, corrosive sublimate and prussic acid must be recorded.

(2) Label must bear death's head.

(3) Label must bear name of some simple antidote, if any is known. Sales must be recorded.

(4) Sales must be recorded. May not be delivered to minors.

(5) Applies to entire state. All sales must be recorded, with name of a witness to the transaction.

(6) Poison defined as any substance dangerous to adult human life in quantities of 60 grains or less.

(7) Label must also contain word "caution," "skull and bones," and at least two of the most readily obtainable effective antidotes. Circumstances of every sale must be recorded. See also "Special Provisions."

(8) Definition of poison same as North Dakota. If poisonous in 5 grains or less, sale must be recorded.

(9) Definition same as North Dakota. If poisonous in 15 grain doses sale must be recorded. Cannot be sold to strangers, unless introduced by person known to the pharmacist.

(10) Sale must be recorded.

#### SPECIAL PROVISIONS AS TO LABELS AND PACKAGES.

*Preparations of Morphine must Have Scarlet Wrapper and Label, and be Printed in White Letters.*—Georgia, Mississippi, New York, Entire State (1), Ohio (2).

(1) Also all preparations of opium containing more than 2 grains to the ounce.

(2) Morphine salts must be dispensed from original vials, which must not hold more than  $\frac{1}{8}$  ounce each.

*All Poison Labels Must be Red.*—Erie County, N. Y. (2), Massachusetts (1), New Jersey, Ohio (3), South Carolina (2), Utah.

(1) Red paper, black letters.

(2) Red ink.

(3) Red paper, white letters.

*Arsenic to be Mixed With Soot or Indigo.*—(One ounce of soot or  $\frac{1}{2}$  ounce indigo to pound of Arsenic.)

#### *Special Provisions.*

*Mississippi, Ohio, Colorado:* Form of Label Prescribed by Board of Pharmacy. Proprietary medicines containing poison must have caution label. Board must furnish list of articles to be labeled poison.

*South Carolina:* Form of Label Prescribed by State Pharmaceutical Association.

#### SPECIAL RESTRICTIONS ON SALE OF NARCOTICS.

*Georgia:* May not furnish opium or any preparation containing more than two grains to ounce to any person after receipt of notice from a near relative that such person is habitually addicted to its use, except on written prescription of a physician setting forth the necessity of the drug.

*Mississippi:* Salts of morphine to be dispensed only on written certificate of a physician stating the necessity of the drug, and the name of person for whom intended. The certificate must be preserved.

*New York (Entire State):* A prescription containing more than  $\frac{1}{4}$  grain of opium,  $\frac{1}{20}$  grain morphine or cocaine, or 10 grains chloral to the dose, may not be refilled more than once without verbal or written order of a physician.

#### PHARMACISTS COMPOUNDING PRESCRIPTIONS MUST PRESERVE THE ORIGINAL.

California, 2 years; Kansas; Kentucky, 2 years; Missouri; Rhode Island, 5 years.

Except in Missouri and Kansas, a copy must be furnished on request of a prescribing physician.

#### PART FOUR.—PROVISIONS AFFECTING ADULTERATIONS.

In the pharmacy laws of 13 States there are no provisions prohibiting adulterations, though in some of these States, if not in most of them, the subject is regulated by provisions contained in the general statutes. These latter provisions are embraced in the analysis, so far as they have come to the knowledge of the writer. In 19 statutes intentional adulteration is prohibited, and the pharmacist held responsible for the quality of goods, except in the case of proprietary articles and goods dispensed in the original packages of the manufacturer. In 16 statutes willful adulteration only is prohibited. In three States adulteration consists of any variation

whatever from the standard set by the statutes, and proprietary articles and goods in original packages are not excepted.

*Adulteration Not Prohibited by the Pharmacy Act.*—Colorado, Delaware, Erie County, N. Y., Louisiana, Maine, New Hampshire, Mississippi, (1), New York (State law), Ohio (1), Oklahoma, South Carolina, Texas, Vermont.

(1) Is prohibited by a separate statute. (See below.)

*Wilful Adulteration Prohibited.*—Arkansas, California, Connecticut, Illinois, Kentucky (1), Maryland, Massachusetts, Michigan, Mississippi (2), Nebraska, New Jersey, Pennsylvania, Rhode Island, South Dakota, Tennessee, Wyoming.

(1) Drug used when inert from age deemed a substitution.

(2) By separate statute.

*Wilful Adulteration Prohibited, and Pharmacist Held Responsible for Quality, Except Proprietary Articles and Goods Dispensed in Original Packages.*—Alabama, District of Columbia, Florida, Idaho, Iowa, Kansas (1), Kings County, N. Y., Minnesota, Missouri, Montana, New Mexico, New York City, North Carolina, North Dakota, Oregon, Utah, Washington, West Virginia, Wisconsin.

(1) Proprieties and goods in original packages not excepted.

*Adulteration Consists of any Variation from the Standard set by the Statute. Proprietary Articles and Goods in Original Packages Not Excepted.*—Georgia, Ohio (1), Virginia (2).

(1) Separate statute.

(2) In Virginia goods in original packages are excepted.

#### SALES OF DRUGS BY GENERAL MERCHANTS.

In a majority of the pharmacy acts exceptions are made permitting the sale of certain classes of drugs and medicines and proprietary articles by dealers in general merchandise. Sometimes the exceptions are made in general terms, and again by stating specifically the articles which such dealers may lawfully handle. In some cases the exceptions are made so broad as to practically enable unlicensed persons to practice pharmacy. See also "Minor Certificates," Part 3.

*No Exceptions in Favor of Merchants.*—Alabama, District of Columbia, Kings County, N. Y., Mississippi, Missouri, New York City, Oklahoma, South Dakota, Texas.

*Merchants May Sell Proprietary Articles Only.*—Delaware, (1), Florida (2), Maine, Nebraska, New Hampshire, Oregon.

(1) Indefinite, prohibits in Section 1 and permits in Section 11.

(2) In original packages. Law does not apply to towns of less than 200 inhabitants.

*Merchants May Sell Proprieties and Non-Poisonous Remedies.*—Ar-

kansas, Georgia, Iowa (1), Kansas (2), Massachusetts, Minnesota (3), New Jersey (2), New Mexico (4), North Carolina (5), West Virginia (6).

(1) Also potash, soda lye, and Paris green when kept in packages and labeled poison.

(2) In rural districts only. Permit necessary in Kansas.

(3) When more than one mile from a druggist, common poisons, also.

(4) Miners and ranchmen may supply employees. See also Minor Certificates, etc.

(5) Also laudanum in original packages.

(6) In rural districts, and where there is no registered pharmacist.

*Merchants May Sell the Usual Domestic Remedies and Proprieties.*—Idaho (1), Erie County, N. Y., Illinois (2), Kentucky, Louisiana (3), Virginia (4).

(1) Also strychnine and phosphorus and their compositions, when put up by registered pharmacist or wholesaler and sold for vermin killers.

(2) On permit of Pharmacy Board.

(3) Poisons also when properly labeled.

(4) Laudanum, morphine and proprieties in original packages.

*Merchants May Sell Common Drugs and Proprieties, When in Original Packages and Labeled by Registered Pharmacist.*—Connecticut, Maryland, Michigan (1), North Dakota (2), Ohio, Rhode Island (3), Tennessee, Washington, Wisconsin (4), Wyoming.

(1) Common remedies must be labeled with dose, from 3 to 21 years, and if poisonous, with name of some common antidote.

(2) Patents must bear the name of the contents and of the pharmacist or physician by whom compounded.

(3) See "Minor Certificates," etc.

(4) Also Paris green when put up in packages and labeled poison. Patents must be labeled with the contents and name of R. P. or M. D. by whom compounded.

### *Special Exceptions in Favor of Merchants.*

*Colorado*: Merchants may sell "such poisons, acids and chemicals as are regularly used in agriculture, mining and the arts," when in sealed and plainly labeled packages. In towns of 500 or less such medicines, compounds and chemicals as are required by the general public.

*Montana*: Same as Colorado.

*New York, State*: Paris green, white hellebore and other insecticides and for use in the arts. In rural districts, where there is no Registered Pharmacist, such domestic remedies as may safely be employed without advice of a physician.

*Pennsylvania*: Patent and commonly used medicines and poisons, subject to provisions regulating adulterations and labeling of poisons.

*South Carolina*: Medicines already prepared. Must attach a copy of label attached by the wholesaler. Subject to provisions regulating adulterations and poisons.

*Utah*: All medicines and pharmaceutical preparations required by the general public, and bearing manufacturer's name.

*Vermont*: Dealers in general merchandise may sell "drugs, medicines and poisons."

#### ITINERANT VENDORS REQUIRED TO PAY A LICENSE FEE.

In six of the pharmacy laws there are provisions which require itinerant vendors of medicines or appliances for the cure of disease or deformity to pay an annual license fee of from \$50 to \$500. In Montana the fee must be paid in each county in which the person attempts to do business.

Alabama, \$100; District of Columbia, \$200; Florida, \$500; Iowa, \$100; Montana, \$50; Oklahoma, \$100.

#### UNCLASSIFIED PROVISIONS.

##### *Concerning Boards of Pharmacy.*

*Missouri*: The board may not inquire into the source of an applicant's knowledge.

*Mississippi*: All examinations must be upon written questions and answers.

*South Dakota*: Members of the board are liable to a fine of \$50 for failure to perform their duties.

##### *Receipts Paid into and Disbursements Made from State Treasury.*

Massachusetts, Oklahoma (1), Vermont (1).

(1) Disbursements must not exceed receipts.

##### *Concerning Licentiate and Registration.*

*Georgia*: In prosecutions under the pharmacy act the burden of proof is upon the defendant.

*Illinois*: The name of the registered pharmacist must be displayed above the door of the room or department where drugs are sold.

*Kentucky*: Annually the county clerk must report the number of registered pharmacists in his county to the Board of Pharmacy and to the grand jury.

*Pennsylvania*: Widow or legal representatives of deceased pharmacist may continue the business with properly-qualified assistant in charge.

*Rhode Island*: Wholesalers must have one or more registered assistants.

*Texas*: Court must give the pharmacy act in charge to every grand jury.

*Virginia*: Registered assistant may be left in charge of a store for six consecutive days, but for not more than a total of 30 days in a year.

*Colorado*: False representations to a state officer as to the composition of a medicine is made a misdemeanor.

After discussion of the above paper by Messrs. Thompson, Sheppard, Bartley and Whelpley, the Secretary was instructed to furnish unbound printed copies to such Boards of Pharmacy and journals as may make requests for the same.

Mr. Sheppard offered the following resolution, which was unanimously adopted :

*Resolved*, That it is the sense of this Section that renewal of registration by Boards of Pharmacy is desirable.

The following paper on uniformity in pharmacy legislation was offered by the author in reply to Query 4 sent out by the Section.

"WHAT IS THE BEST METHOD OF BRINGING ABOUT GREATER UNIFORMITY IN PHARMACY LEGISLATION IN THE DIFFERENT STATES?"

BY J. H. BEAL.

The 49 pharmacy laws of the United States afford a good illustration of one of the peculiar features of the American system of government. On all matters of national and inter-state concern the Congress has exclusive jurisdiction: while in all matters of purely domestic concern, and relating to the every-day life of its citizens, as the exercise of police power and the administration of justice, the control of the state is exclusive, and conclusive. As a consequence, different states may deal with the same subject in many different ways. In one respect this is an advantage. It enables us to experiment at legislation at a much faster rate than if there were but one law-making body for all states and for all matters. The existence in 40 states of as many different laws upon the same subject will yield approximately the same volume of experience in one year that could be gained in 40 years with one legislative body. Moreover, it enables us to compare the merits of different enactments working side by side, under nearly the same conditions.

Since the enactment of the pharmacy law for New York City in 1839, pharmacy legislation has been a continuous series of experiments, some of which have been comparatively successful, some quite the reverse. While there has not, as yet, been evolved a perfect pharmacy law, numerous facts and general principles have been established, public opinion has been created with respect to pharmacy legislation, and a fund of experience accumulated from which may be drawn the material for new laws that shall be without some of the defects of the old ones.

It may be taken as established almost beyond doubt, both by decisions of the Federal Courts and by the dicta of eminent jurists, almost as authoritative as such decisions, that the Congress has no constitutional power to regulate the practice of pharmacy, or, for that matter, any profession within the territorial limits of the several states. This does not involve a denial of the power to regulate pharmacy and its products so far as they may become the subjects of interstate commerce or of Federal revenue. The authority of the general government in such matters is supreme and undisputed. A national law might prescribe the quality of



pharmaceutical products intended to be transported from one state into another ; but when the transportation is ended and the original package broken for distribution, the control of the general government ceases, provided the articles do not again enter interstate commerce and are not the subject of revenue.

Possibly, a federal law might even go so far as to regulate the rights of a licensee of one state under the laws of another, but certainly not beyond this point. However desirable such laws might be in themselves, they will fall far short of furnishing such a comprehensive regulation of the practice of pharmacy as present sentiment demands.

If the above views are valid, then the only way of obtaining uniformity in legislation is by the voluntary action of the various states in adopting a common form of law.

Several excellent general forms of law have already been prepared, notably one presented by Prof. C. S. N. Hallberg to this Section at the Asheville meeting, another published some time since by Prof. Oscar Oldberg, and possibly others. The chief objections to this plan are, first, that the author is too liable to make his model what it ought to be rather than what the average legislature would be willing to enact into law ; and second, that any form of law which originates with or seems to originate with only a few persons is not likely to meet with general acceptance. Those who have had experience before legislative committees will recall the fact that the argument which most frequently operates adversely to the bill is that it is advocated by a few who hope to profit by its enactment and is not desired by the profession at large, which argument, false and foolish as may be, has probably defeated more pharmacy legislation than all others combined.

The only source from which a form of law could emanate that would be likely to command sufficient respect to insure its general acceptance in all parts of the country is the American Pharmaceutical Association. That this should be undertaken by this Section was urged by the chairman, Mr. J. M. Good, in his address at the Denver meeting, and partly with this object in view statistics have been collected and abstracts of existing legislation prepared. Upon reflection, however, it has seemed to the writer that we should go farther back still, and begin by taking into our confidence from the first, the various state associations and boards of pharmacy, since if our model is not always to remain a model, it must have the endorsement of those whose influence must procure its enactment into law, and administer it when enacted. In short, that there should be a preliminary draught submitted to the boards of pharmacy, state associations and leading educators everywhere, for their amendments and suggestions, and from the returns from all of these sources a final draught compiled for the consideration of this Section at its next annual meeting.

Some of the reasons which may be urged in favor of this plan are :

(1) By enlisting the boards, associations and colleges from the start we should not only profit by the experience and wisdom of all these sources, but the final result would be far more likely to command their cordial sympathy and support, than if the model should be framed without their assistance and presented to them for their acceptance or rejection.

(2) It would issue under the auspices of the authority which more than any other, or more than all others combined, is capable of intelligently pronouncing upon the questions involved, and would carry with it corresponding weight and influence.

(3) It would demonstrate in a tangible and forceful way the value of this organization to the pharmacists of America, and of its hearty interest in their welfare.

(4) Finally, it would enable the pharmacists of the various states in asking for new legislation to lay the model before the legislature with the statement that it represented the concrete and deliberate judgment of every authority in America whose opinion upon pharmaceutical legislation was worth the having.

Possibly a law formulated in this manner would not be intrinsically any better than one prepared without calling in these outside aids; in fact it is likely that the form thus wrought out would not be materially different from one that an average committee might construct; but the moral effect of a form of law to whose construction all parties had contributed, would be vastly greater than could be exerted by a law formulated by a single committee, no matter how illustrious its members, or by a single association, no matter how great its influence.

*Scio, O., July, 1896.*

At the conclusion of this paper Mr. Beal offered the following resolution:

*Resolved*, That a committee of three be appointed to enter into communication with the various Boards of Pharmacy, the legislative committees of pharmaceutical associations, and the pharmaceutical colleges of the United States and Canada, requesting them to coöperate in the draughting of a Model Pharmacy Law, which form of law so draughted shall be submitted for the consideration and approval of this Association at its next annual meeting.

After considerable discussion participated in by Messrs. Stewart, Fennel, Remington, Ebert, Thompson, Whelpley, Ryan, Bartley, Morrison, Kremers and Beal, the subject was on motion of Mr. Sheppard referred to the Committee of this Section, with power to act.

Mr. Jacobs' paper on pharmaceutical jurisprudence was read by title and referred to the Committee on Publication.

#### PHARMACEUTICAL JURISPRUDENCE.

BY JOS. JACOBS.

The growth of pharmacy as a science, its varied and extensive influence upon society at large, and the advanced expansion of civilization generally,

have multiplied the number and diversified the character of public statutes and judicial decisions that affect our every-day life and business as professional pharmacists.

From the simplest and most common acts in our experience to the most complicated concerns of our business, we are confronted with the questions, What is the law? What are the legal consequences likely to flow from the proposed conduct?

These are truisms applicable to men in every station and of all avocations, indeed, and are so universally recognized. But, it is only where the calling has become one complicated with numerous other avocations in such manner as to give rise to a growth of a system of statutes and decisions, that it becomes a matter of interest to have the law of that calling codified into a separate volume, logically and carefully compiled and indexed for easy reference.

Thus, we observe that, as merchants we have the law merchant, or mercantile law, giving the rules that are guides to courts in deciding questions and issues arising from the incidents of trade, in general. The books upon maritime law, or international law, or the military law, form themselves into separate libraries pertaining to their respective subjects. One separate branch of the law is known as Medical Jurisprudence, where we may find collected the wisdom of the ages, founded on scientific deductions from actual human experiences in those matters wherein are involved the learning of the Doctors of Medicine and which come up for judicial determination.

Why should not we, as pharmacists, gather into orderly and compact form all the legal learning that specially pertains to our honorable and increasingly useful profession, in such a complete and easily available arrangement that we may readily be apprised of our rights in every situation and clearly pointed to our duties, wherever doubts as to either may confront us.

Of course, when we reflect a moment, we will realize that this is an undertaking that cannot be accomplished in a day. Such a volume, to be of value, should be framed in a wide and philosophical spirit. It should be founded upon a complete collection of all the varied material which is now scattered through the acts of legislative bodies, and in the principles that have been decided in all the courts.

I fully recognize the wisdom of the founders of our Association's constitution in providing for a Section of Legislation and Education; and the reports on legislation which this Section through its committees has made, from time to time, we will one and all confess to be the source of great benefit to us all. Instead of minifying the value of this work, I only contend for the enlargement of this field of labor, and offer these suggestions in the spirit of a hope for progress and improvement in the line of the same endeavor.

The material already collected, consisting of the pharmacy regulating laws of most of the States of the Federal Union and of some of the countries foreign to them, and the reports of cases at law that from time to time have been scattered along the pages of pharmaceutical journals, form a valuable mass of matter that can be utilized in the hands of the author of our text-book on Pharmaceutical Jurisprudence.

The idea which I wish to make prominent in this paper is the value that would attach to a system of pharmaceutical jurisprudence. What we need is an exhaustive and accurate compilation of every law and every legal decision that bears especially upon the practice of our profession in our responsible professional relations to the public, to physicians, to each other, and to the State, and which shall be arranged and tabulated in the clearest and easiest manner for ready reference, in times when legal bearings in these relations arise to disconcert us.

If there is a Medical Jurisprudence, why not a Pharmaceutical Jurisprudence?

Let us take, for instance, the case of the pharmacist on the witness stand when called upon to testify as an expert in regard to the chemical nature of the mode of manufacture of some medicine or drug. What a source of satisfaction it would be to one so situated to feel that he could be fully enlightened and refreshed as to his duties and relationship to the court, to the jury and the parties at interest in the trial. A chapter or more upon this subject could be compiled by some one learned in the law and thoroughly informed upon the subject of pharmacy.

But the source of legal information and cultivation to us, all that would prove most prolific, would be a collection and proper disposition of all the decisions of courts of last resort in our own and other countries, in which the rights or obligations of pharmacists are the basis.

These decisions involve matters of interest to us all, and while now they may not be so numerous as those upon some branches of the law, yet they possess their own distinct peculiarities and are constantly increasing in frequency.

Each decision may furnish a precedent which, in the first instance, affects only the parties to the case, but which may any moment become applicable to any one of us.

Decisions in regard to the patent and trade mark laws, decisions interpreting the statutes of the different states both in civil and criminal matters, are constantly being rendered.

These, of course, go into the State Reports and into the United States reports of cases, but are lost in the labyrinth of other decisions, except to the professional lawyer, and found only by diligent and costly search.

What I contend for is the preservation of these decisions and a proper reference of them, so that they may in the future become easily available when our text-book on Pharmaceutical Jurisprudence is written.

Let us make a beginning in the direction pointed out at this session of our Association. By adopting the plan which I shall advocate—and I cheerfully invite the suggestions of all others on the subject—we shall, from year to year, have all of this information in a more available form than we have heretofore enjoyed, and, as we go along, shall have the satisfaction of knowing that we are building wisely and well for the benefit of the pharmacists of the future.

To the ends thus stated, I propose at the proper time to introduce the following offer to amend our Constitution: Amend, wherever the word "Legislation" occurs, by striking out the word "Legislation" and inserting the word "Jurisprudence"; and amend Section IX., Article XII., by inserting the following in lieu of that Section and Article, to wit:

"The Committee on Pharmaceutical Jurisprudence and Education shall be elected by the Section on Pharmaceutical Jurisprudence and Education, and shall keep a record of and compile for reference the enactments of the different States of the United States and Canada regulating the practice of pharmacy and sale of medicines, and shall diligently seek out and obtain the decisions of all the Supreme Courts of the countries named on subjects pertaining to or involving the practice of pharmacy or sale of medicines, and all other decisions which especially affect the pharmacists. It shall make a complete report each year to the Association as to what legislation on pharmaceutical subjects has occurred during the year, and a succinct report of each decision of such Supreme Courts that said Committee has been enabled to ascertain and obtain, which shall be furnished to the General Secretary for publication in the Annual Proceedings; and shall attend to such other duties as may be delegated to it by the Section, or are now imposed by law."

To the end that we may accumulate information on legal subjects valuable to us all, I would suggest that, besides the work done by the special committee I have mentioned, we shall each as members report every case at law, touching our interests, that may come within our observation or in which we may be involved.

Let us adopt a system of reporting here, at our annual conventions, our mutual experiences in this connection, giving all the benefit of these to guide the future conduct of our business.

True it is that we discuss such matters among ourselves as happenings by the way, but no permanent record is now kept within easy reach. I would further suggest that everything pertaining to the work I have outlined shall be published in our Annual Proceedings under the title *Laws and Comments*, under one head and separate from matters of *Education*, similarly to the Report on Progress of Pharmacy.

We need not fear, but that when enough material for this book shall have been collected by us, who make the facts and to whose hands is appropriately committed their preservation and collection, the man in every way fitted for its editing will come to the front.

In our own ranks there are many who are competent for this position. In the hands of many of our college professors, learned in all the sciences and gifted in the accomplishments of philosophy and literature, the Science of Pharmaceutical Jurisprudence could be fashioned into a book that would take rank with the writings of Wharton, Beck and Dean in the domain of Medical Jurisprudence, and which, while enlightening and guiding future generations of pharmacists, would adorn pharmaceutical literature and prove a blessing in aid of the administration of justice in the ages to come.

Let us go on record as in favor of the creation of such a book and its use in our Colleges of Pharmacy, encouraging the work until there shall be given to the world this new contribution to its literature and its learning, thus adding a new glory to the achievements of the American Pharmaceutical Association.

*Atlanta, Ga., July, 1896.*

The installation of officers being next in order, Messrs. Thompson and Hereth were appointed by the chairman a committee to conduct the newly-elected officers to the platform.

Messrs. Hallberg and Beal having been introduced as the chairman and secretary respectively for the ensuing year, responded briefly, expressing their thanks for the honor conferred by their re-election.

There being no further business before the meeting, the reading of the minutes was on motion dispensed with, and the Section adjourned to meet again at Lake Minnetonka in August, 1897.

## ENTERTAINMENTS AT THE FORTY-FOURTH ANNUAL MEETING.

FOR the second time since its organization the Association met on Canadian soil, and although the meeting was not as largely attended as on several recent occasions, no doubt owing to the general business depression throughout the country, it was greatly enjoyed by all who had found it convenient to visit a city and country so full of important historical associations.

While the visitor to Montreal realizes at once that he is in a modern metropolis, the free use everywhere of the French language and the numerous French business signs impress him with the idea that he has entered a new country. To those members who visited Canada for the first time, the meeting at Montreal with its attendant side-trips to Ottawa, Quebec and the Saguenay river, will leave delightful and ever-recurring recollections of a most enjoyable trip. The many kind attentions shown the visitors by the Canadian pharmacists will always be highly appreciated, and are sure to lead to more intimate friendly relations, which will redound to the benefit of the Association at large.

On Wednesday evening, August 12th, a reception tendered by the Pharmaceutical Association of the Province of Quebec and the Montreal College of Pharmacy was held in the parlors of the Windsor Hotel, which offered an excellent opportunity for forming new and renewing old acquaintances. Music and refreshments added to the enjoyments of the evening, which closed with a series of dances arranged for the benefit of the young ladies present.

On Thursday evening after dinner quite a large party of ladies and gentlemen, under the guidance of Messrs. Morrison, Reed, Macmillan, Chapman, and others, proceeded by boat to Boucherville to witness the French festivities known as "fête des nuits." The trip was remarkable more for the immense crowd and consequent discomfort than for any real enjoyment, which may have been due in part to the inability of the visitors to assume the French character and disposition necessary for the occasion.

The extended electric car ride on Friday afternoon through the city and its surroundings enabled all who participated to get an excellent view of the many public buildings and points of historical interest.

A marked impression is made upon all visitors to Montreal by the evi-

**dent** desire to perpetuate the memory of the early settlers and brave **pioneers** by appropriate tablets and inscriptions recording deeds of both **French** and English valor. Of special interest are the **Maisonneuve** and **Nelson** monuments, the **Chateau de Ramesay**, the **Cathedrals of Notre Dame** and **St. James**, the **Bonsecours Church**, built in 1642, the **French Market**, the municipal buildings, the **Bank of Montreal**, **Victoria** and **Dominion Squares**, the **French** and **English hospitals**, **McGill** and **Laval Universities**, the two magnificent railroad bridges spanning the **St. Lawrence river**, and **Mount Royal Park** with its inclined railway.

On Monday, Aug. 17th, the visiting members, as the guests of the Canadian associations, took a trip on board the steamer **Corsican** through the **Lachine Canal** and **Rapids**. Leaving the wharf about 9 o'clock, a most enjoyable day was spent in passing through the canal, a distance of nearly 8 miles, and then up the river as far as **Lake St. Louis**, whence the return was made through the **Lachine Rapids**, which latter proved quite a novel and enjoyable experience, but not as exciting as it had been foreshadowed and probably would have been if the river had been less calm or the descent could have been made in row-boats. Returning to **Montreal** about 4 o'clock in the afternoon, the Association, after dinner, attended an entertainment of vocal and instrumental music interspersed with declamations, given in **Windsor Hall**.

After the adjournment of the last General Session a Social Session, as provided for in the By-Laws, was inaugurated. A party of the members visited **Ottawa** to witness the opening of the **Dominion Parliament** and to inspect the beautiful **Parliament Buildings** and the **Government Experiment Farm**. Under the guidance of Messrs. **W. Saunders** and **H. Watters** a day was pleasantly spent in sight-seeing. Others took a trip to the famous **Saguenay river** and **Quebec**. At the latter place a sojourn of a few days enabled the visitors to enjoy the kind provisions for pleasure made by the resident pharmacists represented by Messrs. **Roy**, **Lemieux**, **Dubois** and **Viellieux**. The trip by rail to the **Falls of Montmorency** revealed many points of natural beauty, while a visit to the shrine of **Ste. Anne de Beauprè** impressed all strangers with a keen sense of the power of blind faith over reason. An extended drive in carriages through the principal streets to **Spenser Wood**, the lieutenant-governor's residence, to the **Sillery Nurseries**, the **Plains of Abraham** and the monument to **Gen. Wolfe**, occupied several hours. A visit was also paid to **Liberté's** extensive fur establishment. Other places of interest visited during the stay at the quaint old city were the **Chateau Frontenac**, **Dufferin Terrace**, the **Citadel**, the **Provincial Parliament Buildings**, the **Ursuline Convent**, the **Market**, **Lower Champlain Street**, **Wolfe's Cove**, the spot where the gallant but reckless **Montgomery** fell in December, 1775, the **Levis monument**, the church of **Notre-Dame de Victoires**, built in 1688, the **Basilica**, the double monument to **Wolfe** and **Montcalm** in the **Governor's Garden**, and



the Post Office, bearing on its front wall the famous sign of the Golden Dog.

A fitting end to the sojourn at Quebec was a drive in caleches to Point Levis and other surroundings, which was greatly enjoyed.

CHAS. CASPARI, JR.,  
*General Secretary.*

# REPORT

## ON THE

# PROGRESS OF PHARMACY.

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From July 1, 1895, to June 30, 1896.

BY C. LEWIS DIEHL.

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After an interval of four years, your reporter has again been entrusted with the compilation of the "Report on the Progress of Pharmacy," a task which he was forced to relinquish by reason of ill health. Having consented to again fill this responsible office, he naturally presumed that the task—under no condition an easy one—would at least be as familiar to him as it was in the past. But he soon realized that, like in the experience of Rip van Winkle of old, he had enjoyed a longer sleep than he knew, and that he had much to learn before he could grasp the facts and observations of modern investigation presented to him with anything like the facility that had been experienced when making the reports during former years. And this too in the face of the fact that he had, or rather thought he had, kept reasonably posted on the progress of events concerning pharmacy.

The intense activity in scientific research during recent years has manifested itself to a greater degree in the domains of chemistry and therapy than in that of pharmacy, and covers a ground which it is impracticable to completely encompass within the scope of a report on the progress of pharmacy. It has been necessary, therefore, to exercise careful discrimination in the selection of subjects for abstraction, bearing in mind the important fact that this report is not intended to be a repository of *all* observations that have been made in the domains of the several sciences with which pharmacy is concerned, but primarily for such selected subjects as are of interest to the practicing pharmacist—for whose benefit and advancement this Association was organized—and incidentally for such ob-

servations as may be of equal or even greater interest to the teachers in our schools, and to scientists generally. It should be remembered that the average practical pharmacist is interested, not so much in the complicated theories of modern chemistry and therapeutics, as he is in a knowledge of the products and the uses to which they are applied in practice ; and that those who have a scientific inclination, college professors and professional chemists, usually have access to a literature which more than supplies any deficiency of this report in that direction.

This is not to say, however, that practical pharmacists do not, or should not, pay attention to the scientific questions involved in their practice. Quite the contrary is the case, and it is held that the average pharmacist of to-day is better prepared and qualified to carry out independent investigations than he was in the past, when, as we well know, pharmacists were among the most active investigators in the domain of the natural sciences. This opinion is borne out by the number and quality of the investigations made by pharmacists during the past year that are embodied in the present report ; and the sweeping judgment, voiced here and there, that the pharmacist of to-day is merely a tradesman and not a professional man, is therefore a harsh one and not justified by the facts. Under the pressure of modern practice, the increasing disposition of physicians to prescribe specialties, and the enormous efforts of manufacturing pharmacists to introduce these specialties as well as those products of their manufacture which in former years were prepared in the pharmacist's own laboratory, it is no wonder that in many instances the pharmacist, being overwhelmed with the demand for goods supplied through the trade, while the products of his own make go begging, has lost courage and resigns himself to the condition of a mere vender of medicines. It is to combat this tendency that pharmacists have associated themselves everywhere, in cities, counties, states, and—in our Association—for the entire Union, and that they meet in council at stated intervals to discuss the situation, and to evolve plans and expedients whereby pharmacy may be established unqualifiedly upon a professional basis.

But the reporter is reminded that his office is to record rather than to discuss the observations and problems bearing upon the progress of pharmacy, and he proposes, therefore, to give in brief review some of the thoughts that have been communicated in the pharmaceutical press during the past year on subjects concerning the status of pharmacy. Thus the editor of the "Pharmaceutical Review," Jan., 1896 (Professor E. Kremers) says: The argument of the college professor that pharmacy is a profession because several thousand young men spend a few winter evenings in the college amphitheatre, whereas at the beginning of the century we had no colleges of pharmacy whatever, is based upon no better ground than that of the commercial pharmacist that pharmacy is no profession and never was a profession. It may be conceded that the

average American druggist is not a professional man, and it is held that to make the professional pharmacist possible—not as an individual, but as a class—the ranks of the druggists must be well nigh decimated. This can be done only by demanding a high educational standard, which will bar all but the very best. Much has been done in recent years, but much remains to be done; one of the more genuine methods of improving the general status of pharmacy being that which is being tried with no mean success in some of the State universities, in which courses in pharmacy are now offered equal in educational value to the other four-year courses of these institutions. This alone can place the pharmaceutical student on a par with his fellow-students at the university, and later on with such men, in other walks of life, as have enjoyed a liberal education. Legislation, also, will have to be called into requisition as an aid to raise pharmacy to a professional standard. Unfortunately our laws, so far enacted, are neither perfect in theory nor are they enforced as stringently as their importance demands; this being partly for the want of power given to the authorities entrusted with their execution, and partly on account of negligence. But in spite of the ineffectiveness of much pharmaceutical legislation, a calmer and more experienced sentiment is pointing the way to better and more efficient legislation, which, to become effective, must demand a higher educational standard.

Pertinent to this subject is the following, abstracted from a series of editorials in "Merck's Report" during 1895. While the advocates of theoretical education *before* practical experience, though persistent and prominent, are not very numerous, a different state of affairs exists as to the question of *continuing* the shop service during the college course. To the casual observer this burdening of a young man with work of a two-fold nature must appear as a most singular feature in our pharmaceutical evolution; but the explanation is found if we trace the history of our pharmaceutical education back to its beginnings. Unlike the pharmaceutical schools which in late years have been established as part of State universities, and were created perfect and complete, the independent colleges of pharmacy—indeed, some of the largest and best renowned—commenced as small private classes conducted by a few well-meaning apothecaries. It is natural that this first attempt at pharmaceutical instruction should have been made *at night*, after the bustle of daily work of those concerned. Neither teacher nor student had any other time at their disposal. There was no flourish of advertising, no enticement by huge, elegantly-furnished buildings and richly-equipped laboratories, and the very idea of pharmaceutical education was so novel and its value so little appreciated—and is in some degrees even in these days when "higher education" has long become the watchword of progressive pharmacy—that an appeal for funds to the rank and file of the profession would have been received at best with a sympathetic smile. But while it is conceded that if all our colleges

were canvassed, the majority would declare in favor of the double employment which has initially led them to accept such unfavorable hours as the latter end of the evening for the time of their lectures, it becomes a very pertinent question why the student, in view of the facilities now offered by all the colleges, should be hampered with shop-work *during* his college course. If the pharmaceutical aspirant is to go to college at all, give him time to do so at reasonable hours; time for study; time for home work; time for recreation—so important an element to the healthy growth of youth—and, what is more needful than all, free his mind from the gnawing worry and care of the tedious “shop work” during the period when he is engaged in acquiring the theoretical knowledge so necessary to the intelligent pursuit of his profession.

It is but fair in this connection to give the views held by the “persistent and prominent” few who advocate theoretical education *before* practical experience. In the February number (1896) of the “Pharm. Review” the editor (Dr. Kremers) discusses the value of practical experience, in the course of which he ventilates this idea very thoroughly. Speaking of the precedent established by Ann Arbor (in 1894) in dropping the the practical experience clause from the requirements of graduation, which has since been followed by other university schools and some independent colleges of pharmacy, he says that the advocates of the new movement are again and again accused of depreciating the value of practical experience. The apprenticeship insisted upon by those advocating the old system, had its origin in a very primitive stage of civilized society. It grew normally with the development of the guilds, being in its prime in the 15th century, and with the decadence of the guilds it was also weakened, and has since been dropped by profession after profession. By dropping the practical experience clause, the university schools do not, however, mean to imply that their graduates are finished products; but it is held that such a graduate is better fitted to acquire the practical details of the drug business than are young lads of twelve, fourteen, or at most sixteen years; that it will require less time for them to master the details of the practical business; and that, therefore, the obsolete system of apprenticeship is an unnecessary condition. The colleges who graduate young men and women without practical experience, simply have an educational function, and try to offer to the masters of the profession such young men and women as have a capacity to become masters in turn if they receive the proper guidance at the hands of their experienced elders.

Owing to the modern innovations in the practice of medicine already mentioned, the pharmacist's field of usefulness has in some directions been seriously contracted, and he is therefore compelled to seek new channels for the development of his professional industry, and for increasing his income. “Microscopy,” and, intimately connected with this, “Bacteri-

ology," are fields that are open to him under proper application, while "analytical work" has long been regarded as a part of his "higher education." In the December (1895) number of the "Pharmaceutische Rundschau," the editor, Dr. Frederick Hoffman, again calls attention to the importance that pharmacists should qualify themselves in analytical work, so that they may be entrusted with and share the work in a field that is now almost exclusively occupied by professional analysts. A particularly fruitful field that with proper qualifications is open to pharmacists, is that of the examination of food; but, unfortunately, it is just in this direction that our colleges of pharmacy have hitherto failed to make suitable provision, and even the university schools and the schools of practical chemistry have failed to give more than a superficial consideration to this important branch of analytical work. It is but natural that with the progress and dissemination of scientific knowledge for the common good, its abuse should go hand in hand, and this manifests itself in practices of adulteration, sophistication and fraud for sordid considerations, that cover articles of every description in common and daily use. Hence a wide field has been opened to experts, heretofore recruited on account of their individual qualifications from among physicians, chemists, and pharmacists, known as "Food Analysts" or "Public Analysts," in states and communities throughout the civilized world. In the German Empire, indeed, the qualifications that entitle this class of experts to practice their profession have recently been formulated and established by law: exceptions from its provisions being only such persons as have successfully passed the examination in the natural science courses required for teachers of the higher grades, or "Apothecaries" who have passed the "Staats-Examen" with the predicate "very good." It is only a question of time, when in our country also "Public Analysts," or "Food Analysts," will become regularly appointed State or municipal officers, and it is therefore timely that our colleges of pharmacy and universities should offer their students the necessary instruction, either by post-graduate courses or otherwise, so that pharmacists may qualify themselves for the responsible duties of public analysts, and share in any advantages that this new and important field may offer.

That American young men are alive to the importance of superior facilities for acquiring knowledge becomes evident from the very interesting paper on the "Chemical Laboratories of Germany," recently published by Professor Albert B. Prescott, of Ann Arbor. He observes that Germany is without doubt, and has been for a generation or more, the most productive country in the world (in a scientific sense), though that does not necessarily imply that Germany, leads the other countries at all points. Therefore, the working literature of any investigating chemist in any country is inadequate if it does not contain, besides the publications of Germany, those of England, the United States, France and Italy, Austria,

Holland, and other nations. If you set out by course of chemical work to find an answer to any unsettled question, however new and untried your project of work may seem to be, the library will probably reveal that some one in some laboratory, not always in Germany, has either furthered or forestalled your modest effort. Continental chemists emphasize that they must read English, and must have the publications of England and America. If we are looking for the unification of mankind we find it in the literature of the investigator; and this is exemplified by an inspection of the chemical libraries, that of the University of Michigan, for instance, being identical, in nine out of ten of its volumes, with the chemical library of a university in Germany or in Switzerland.

German universities are strongly attractive to the graduate students of the whole world, and perhaps most of all to those of the United States; among the causes of attraction being their freedom of study permitting concentration of labor upon the leading subject, their organization for research by the student under direction of a professor, their repute for large scientific production, and the eminence of their professors. In twelve of the more attractive universities and five polytechnic schools, 373 students from the United States were registered last year at one time, being a ratio of one student from the United States to 65 from Germany and all other countries. Of these, medicine obtained the highest number, 75; chemistry the next highest, 59; philosophy, 51; of English students fully one-half are in chemistry, yet these are one-third less numerous than the Americans in the same subject.

Speaking of the popularity of the several chemical laboratories, Professor Prescott says that each laboratory is known for its director in person, for its *ausserordentliche* professors and *privat docenten*, severally and in a body, for the efficiency and working excellence of the building and its appliances, and for the general repute of the university to which it belongs. Each chemical laboratory is valued for the standing and helpfulness of those who direct the *arbeit* for graduation, and for the interest of the lectures given there. In most universities the director gives the cardinal course of lectures, five times or even six times a week through both semesters, covering the inorganic and organic parts of the subject in one class for all those in chemistry, in pharmacy and in medicine. In Berlin, however, the director of the Second Laboratory lectures upon inorganic chemistry when the director of the First Laboratory lectures upon organic; at Leipsic the director of the Second Laboratory lectures upon physical chemistry and special topics, and at Freiburg the fundamental lectures are given by an associate professor, while the director does not lecture at all. In most of the universities the main course of lectures is taken but once as a course by chemical students, though at Heidelberg the course of Victor Meyer is usually taken as many times as the student of chemistry remains years.

As to the estimate of the eminence of their chemists, students in Germany name in the order of their seniority Von Baeyer at Munich, Victor Meyer at Heidelberg, and Emil Fisher at Berlin. To these Professor Prescott adds the names of Wislicenus and Ostwald at Leipzig, Kekulé at Bonn, Claus at Freiburg, Fittig at Strassburg, and E. Schmidt at Marburg, names that are well-known on this side of the Atlantic.

Of chemical laboratory buildings, Professor Prescott says that the best in Europe at present is the one completed eight years ago at Zurich, Switzerland. The Laboratory at Strassburg built a little earlier, and that at Heidelberg built later, rank next as buildings of nearly equal excellence. The laboratory at Goettingen is also nearly new, and is, he believes, a fine building, while the chemical laboratory of the polytechnical school at Aix-la-Chapelle may be included in favorable comparison. But of greater interest were the historic laboratories: that at Bonn built in 1864, whose fair proportions have been often figured in miniature as a symbol of the era of laboratory study; The "First Chemical Laboratory" at Berlin, built in 1867, a plain but unpretentious structure facing the Georgenstrasse; the "Second Chemical Laboratory" at Berlin, an unpretentious little building on Bunsenstrasse; the "First Chemical Laboratory" at Leipzig, built in the last of the sixties; and last but not least, the "Munich Chemical Laboratory," Von Baeyer's, on the Arbeiterstrasse, where Liebig had his working place for the last twenty years of his life until 1873. In this connection also Professor Prescott mentions the experimental laboratories of Germany's great manufacturing firms: of the "Badische Anilin und Soda Fabrik" at Ludwigshafen; of the "Color Works" at Hoechst; of the "United Factories of Zimmer & Co." at Frankfort; and of the chemical works of "Merck" at Darmstadt. Commodious experimental laboratories are connected with all of these, that at Ludwigshafen having a staff of seventy-eight chemists.

The relation between the physician and the pharmacist is the subject of a paper by M. J. Griffin, of Holyoke, Mass., who says that owing to the failure of a mutual understanding of their proper relation each to the other, we seem to have come upon an era of dispensing physician and prescribing pharmacist. The chief blame in this particular lies with those physicians who, unmindful of the rights of the pharmacist, educated and trained in his calling, are governed by their desire for gain, or else by their knowledge of shortcomings in their profession, and compound medicines of their own prescribing, thus leading the pharmacist to prescribe medicines of his own compounding. The physician and the pharmacist should be aware that the true relation of the latter to the former should be that of a complement to his skill. The physician diagnoses the condition of the patient, decides upon the course of treatment, and upon the drug to be administered; and here the pharmacist, with eye single to accuracy of mixture and purity of ingredients, steps in as an ideal com-



plement of the physician. But his function does not end here, for the pharmacist also acts as a check, a sort of examiner of the medicines ordered by the physician. Reciprocally, the aim of the pharmacist should be to establish a reputation for accuracy, purity of drugs and chemicals, courteous and honest treatment of the public, and fair prices for his prescriptions; and the physician should be led to feel that in the pharmacy all that is latest, purest, and best in medicines is being accumulated for his use and assistance in the treatment of human ills.

This author brings nothing new; nothing that has not been inculcated into each and every one of us from the very beginning of our apprenticeships; but he defines fairly well the mutual relations of the physician and the pharmacist, and his remarks may serve as an introductory to a charge of substitution in pharmacy made in the same number of "Merck's Report" (Aug. 15, 1895) in which Mr. Griffin's paper is published. A correspondent cites a certain case of investigation systematically carried out by a committee of physicians and pharmacists in one of our large cities, which conclusively demonstrates, in his opinion, that substitution abounds among the pharmacists of that city to an alarming extent; and he draws the conclusion from this, and from other facts of his personal experience, that the crime of substitution prevails among a certain proportion of pharmacists of the whole country. The question naturally arises how the honest and conscientious pharmacist can protect himself against such damnable practices. He holds that the medical profession will hardly bring about a change, nor that the public or the courts will take the initiative in this matter, but that the remedy and reform can only come from the ranks of the pharmaceutical profession. Conscientious pharmacists must awaken to this fact, and use their influence in local and state associations to have this evil eradicated, not by "pious wishes" but by action. If there is an enemy in the camp, no good can be done by concealing him and boldly asserting that he is not there. The editor of "Merck's Report," conceding that this correspondent's communication is made with honest intentions, and that his suggestions are in the main sound and practical, takes exception on several important points. In the first place he remonstrates emphatically against publishing the result of non-official investigations and exposures, such as the one mentioned in the correspondent's letter. The true way, after having become convinced by privately conducted investigations that a criminal violation of law has been perpetrated, such as will secure conviction and sentence if proven, is for local or state associations to swear out warrants for the arrest and legal prosecution of the offending parties; or, in states in which Boards of Pharmacy are charged with this duty of legal prosecution, to impel them to the performance of this duty. Furthermore, the editor does not agree that any considerable proportion of pharmacists in any community, or throughout our country, are guilty of the practices charged. So, in the

absence of any other than "tell-tale" and ex-parte "reports" the firm belief is expressed: 1st. That the profession of pharmacy necessarily—in the absence of sufficient authoritative check—contains some fraudulent members; 2nd. That it contains, however, probably fewer such unworthy members, per hundred or per thousand, than most other "callings" or classes of men do; 3rd. That it might be made to contain almost none such, if properly regulated by a strict enforcement of existing laws.

A comparison argument to that of the correspondent quoted is that brought forward in W. C. Alpers' paper on "Substitution," read at the meeting of the New Jersey Medical Society to which he was delegated by the New Jersey Pharmaceutical Association, and which is published in the same number of "Merck's Report" (pp. 326-327); but Mr. Alpers' paper, which deals with "dispensing by physicians," is held in a far more conservative tone, and is characterized by honest impartiality. Mr. Alpers observes that the custom of many physicians of late to dispense their own medicines is a fact too well established to need any further proof. The reasons that are given are numerous, among them the one charging that substitution is so generally practiced by pharmacists that physicians do not get what they order, and therefore dispense themselves, is the most serious to the pharmaceutical profession. This bad opinion of the pharmacist is moreover systematically nursed by the salesmen of some manufacturers, and has become an effective argument, bolstered up, as it usually is, by the invention and narration of incredible stories of corruption on the part of the druggist. While it must be admitted that there are degraded fellows in our profession who, for small pecuniary gain, will sacrifice reputation and honor, and soil the name of a noble profession, it is claimed that they are few and little respected, and it is not believed that any honorable physician would conscientiously repeat the sweeping charge that all pharmacists substitute. Such charges should not be considered by the physician unless accompanied by proof in specified cases to be reported to a Board of Pharmacy, and if such proof can and will be brought by the salesman he will deserve thanks for ridding the pharmaceutical profession of an unworthy member. But if it is admitted that human frailty will occasionally submit to the temptation of substitution for the sake of pecuniary gain, it becomes a pertinent question to ask, why it is that only the retailer should yield thereto, and the manufacturer be exempt. Surely, the incentive must be far greater to the manufacturer, who has hundreds or thousands of dollars to gain, than to the retailer, who at best can only save a few cents. The representations that are made respecting many of the goods are by no means in accord with the price at which they are offered to physicians, which is often below the lowest estimate of cost of material. And when it is considered that there is no merchandise in any business whatever for which high price is not considered a *prima-facie* evidence of high quality, it is difficult to conceive why

drugs and medicines should be exempt from this rule, or why the physician dispensing such goods, and having allowed himself to be persuaded that their quality is of the best, does not himself unconsciously become a substituter. It is a well known fact that, in most European countries, dispensing by physicians is restricted by law to cases of emergency. These restrictive laws are enacted, not in the interest of the pharmacists, but for the protection of the public against fraud and error. By putting the responsibility of the quality of medicines on the pharmacist, a powerful safeguard is erected against substitution and mistakes, and there exists no valid reason why, in this country the field of usefulness of this class of men should be destroyed, which it surely will be if physicians persist in dispensing their own medicines. It is to the mutual interest of both professions to eradicate from their ranks the unworthy, whether they be substituters, nostrum-venders, quacks, or ignorant pretenders; to cultivate higher education; and to meet and help each other in a fraternal spirit.

There are individuals in both professions that recognize this dependence, the one upon the other, and who let no opportunity escape them to vigorously proclaim their conviction. But mere preaching counts for naught if it is not followed up by practice, and it is in this direction that pharmacists have become derelict. While therefore it is true that the pharmacist is handicapped in his profession by the ever-increasing demand for specialties and preparations of specified manufacture, there is no reason why he should deliberately enter deeper into the mire, beyond the hope of rescue, by abandoning the manufacture of legitimate preparations. In "a plea for the laboratory," Frank Edel (*Druggists' Circular*, October, 1895) says there can be no question that the tendency of modern pharmacy is away from the laboratory, and to depend largely on the manufacturing pharmacist for laboratory products. This is nothing more or less than retrogression, and to it more than to all other causes combined can be attributed the decrease in the profits of the pharmacist. He is not to be understood as decrying the business of the manufacturing pharmacist, but he can see no reason for paying somebody else to do work that the pharmacist can do for himself. There is no part of the business of the pharmacist so profitable as laboratory work, and not only is such work profitable, but it adds to the pharmacist's reputation. Neither is it necessary to neglect any part of the business in order to give the laboratory the attention it should have, and this attention can be profitably directed to preparations of every description that it has become customary to purchase—menthol pencils, glycerin suppositories, lozenges, tablet triturates and hypodermic tablets; and even compressed tablets, formerly in a measure debarred on account of the cost of the apparatus, can now be conveniently made, because an efficient tablet compressor can be had at moderate cost. In a second paper (*Western Druggist*, February, 1896) Mr. Edel, with the view of en-

couraging pharmacists to make their own preparations, makes some practical observations concerning the misleading arguments that are advanced in order to encourage the pharmacist to purchase manufactured preparations and to discourage him from making them himself. Among the many arguments, the one that by buying the crude drug in large quantities and pounding and grinding it themselves the factories are able to secure a more uniform product than can be made in a retail pharmacy. This is not believed to be true. The pharmacist has no difficulty to secure drugs of a reliable quality, ground and assayed ready for making his preparations equal to any that are supplied by manufacturers; and it has been shown that this can be done at an absolute profit even in the case of "fluid extracts," as numerous recent papers—by Klie and others—testify. Another class of preparations that are very profitable to make is the "elixirs." There can be no possible excuse for pharmacists depending on the manufacturer for these pharmaceuticals. The National Formulary gives processes for making them, and while it is true that some of the formulas are faulty, that need deter no intelligent pharmacist from seeking more perfect formulas, for there is no end of literature on the subject. The most important benefit to be derived from preparing one's own preparations is that when it has become a habit the druggist becomes more and more independent of the manufacturer, while at the same time he adds to his own reputation, and it thus helps him both professionally and financially.

A paper in the same direction is that of Columbus V. Emich (Amer. Druggist, June 25th, 1896). At a recent meeting of one of the State Pharmaceutical Associations, the question "Is it possible for the retail pharmacist to procure first-class goods in quantities of from one to five pounds at such prices as will enable him to prepare 'fluid extracts' in competition with the manufacturer?" was answered in the affirmative. Mr. Emich decided to inquire into the correctness of this answer, and has recorded the nature and result of his inquiry, the latter being also in the affirmative. He has inquired of respectable wholesale dealers (who are named), and is informed that there exists no difficulty to supply the retail dealer with goods of unexceptionable quality. As to the price, this is of course somewhat higher when the purchase is in small parcels, but the difference in the same goods in quantities of one to five pounds is not more than ten to fifteen per cent., and in case of high-priced goods not more than five per cent. from what the manufacturer would have to pay in original package quantities. Nor has the manufacturer any advantage over the retailer as regards the selection. A retailer who is particular in scrutinizing his purchases, and is a competent judge of the same, can always find the choicest goods in the market, as well as any wholesale manufacturer. As regards the possibility of always securing prime goods, Mr. Emich observes that undoubtedly variations exist, and that the claim made by some of the large manufacturers that superior capital and facili-

ities for examining and handling the goods enables them to procure the choice, is apparently reasonable. And yet this is hardly sound reasoning, for the small dealer will be able to purchase well-garbled goods in small quantities, when if he wished the gross lot he would be compelled to take them as they are ; and, as a matter of fact, this handicaps the large manufacturer and inures to the benefit of the smaller dealer. In continuation, Mr. Emich calls attention to the comparative inexpensiveness of the apparatus required for the manufacture of fluid extracts. A few good percolators, water baths, evaporating dishes, possibly a good small press, preferably a good still, and heat appliances, cost but a small sum. As to the cost of making these goods, figures are given on a large number of fluid extracts, which in the majority of cases are below the prices, less the customary discount, quoted by a well-known and reputable manufacturer, while the total saving indicated by these figures is shown to be very decided.

There are other subjects of general interest that might be similarly quoted as has been done in the foregoing, but for this there is neither time nor space. Some of these subjects have been abstracted for this report and will be found in its pages ; others have been necessarily omitted, but without prejudice.

In making the abstracts the reporter has studied brevity and terseness of diction, bringing only so much as may be necessary to a clear understanding of the nature of an investigation or observation made, without necessitating reference to the original. The arrangement is on the lines of previous reports made by this reporter.

In conformity also with previous reports, the reporter has endeavored to give here a brief review of the

#### PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

But only *seventeen* of these annuals have reached him, notwithstanding that the Permanent Secretary had made the request through the proper channels of each Association that its Proceedings be sent to the reporter for this purpose, and the review is therefore incomplete. While in this review only the titles of the papers read before the Association are given, many of them have been abstracted—such being indicated by an asterisk (thus, \*)—and will be found classified under proper headings in the body of the report.

*Alabama.*—The fourteenth annual meeting of the Alabama Pharmaceutical Association was held in Montgomery on May 14 and 15, 1895, Edward E. Elam presiding in the absence of the President and Vice-Presidents. Two sessions were held. No papers were read or presented.

*Connecticut.*—The nineteenth annual meeting of the Connecticut Pharmaceutical Association was held in Norwich on February 5 and 6, 1895, the President, James Duggan, presiding. Three sessions were held. The

only scientific paper presented was a brief report on the progress of pharmacy, embracing about seventeen practical subjects abstracted from various journals.

*Georgia.*—The twentieth annual meeting of the Georgia Pharmaceutical Association was held in Savannah on May 21 and 22, 1895, the President, John P. Turner, presiding. Three sessions were held. The following papers were read :

- \* On the Different Methods of Decolorizing Tincture of Iodine, by R. C. Dickinson.

- \* On an Improved Method and Formula for Ointment of Oxide of Zinc, by R. P. Menard.

On the Best Way to Meet the Impression of the Public as to the Enormous Profits of the Drug Business, etc., by Henry R. Slack.

- \* On the Cultivation, etc., of the Castor Oil Bean, by D. F. Davenport.

On the Position Pharmacists occupy in the Eyes of the Public, by Mrs. Mallory H. Taylor.

On the Necessity of a Change in our Business Policy, by S. C. Parsons.

*Kansas.*—The sixteenth annual meeting of the Kansas Pharmaceutical Association was held in Leavenworth on May 21, 22 and 23, 1896, the President, H. H. Hettinger, presiding. Three sessions were held. The following papers of pharmaceutic interest were read :

Side Lines for Druggists, by Charles Lawrence.

- \* Cucurbita Foetidissima, by L. E. Sayre.

- \* A Review of the Constituents of White and Black Mustard Seed, by E. F. Shopflin.

- \* A Coloring Matter in Dandelion Root collected in the Fall, by Albert Burnham Clarke.

- \* Aplopappus Fremonti, by Thomas M. Bailey.

- \* A Study of the Osha Root and its Volatile Oil, by Wm. F. Bowen.

- \* An Examination of Viburnum Opulus and Viburnum Prunifolium, by Edward E. Cowman.

- \* Examination of Old Oil of Lemon with a View to its Restoration, by B. W. Kelling.

*Kentucky.*—The eighteenth annual meeting of the Kentucky Pharmaceutical Association was held at Mammoth Cave, May 21, 22 and 23, 1895, E. B. Walthall presiding in the absence of the President and Vice-Presidents. Three sessions were held. The following papers were read :

Alkaloidal Assaying, by Oscar Dilly.

Additions to the National Formulary, by Henry W. Preissler.

Non-secret Remedies, by Addison Dimmitt.

The Passing of the Apothecary Shop, by C. J. Rosenham.

*Maine.*—The sixth annual meeting of the Maine Pharmaceutical Association was held at Mt. Kineo, June 25, 26 and 27, 1895, the President, D. W. Heseltine, presiding. Three sessions were held. The following papers were read :

Should our Association Endorse the Course in Pharmacy at the Maine State College? Answer by T. J. Stevens.

On the Best Methods of Advertising, by Lister P. Evans.

Should the Department of Pharmacy of the State College at Orono receive the Endorsement of the Association? Answer by "Pharmacist."

On the Trade or Profession of Pharmacy, by W. A. Robinson.

*Maryland.*—The thirteenth annual meeting of the Maryland State Pharmaceutical Association was held at Baltimore, May 7 and 8, 1895, the President, John F. Hancock, presiding. Two sessions were held. The following papers were read :

- \* Practical Hints on the Value of Organic Drugs Admitting of Determination by Assay, by C. R. R. Beck.

- \* Purity of Oil of Peppermint, by Louis Schulze.

- \* Extraction of Fixed Oil from Ergot, by John Ayd.

The Apothecary of the Navy and a Plea for his Advancement, by C. Marion Dodson, M. D.

*Minnesota.*—The eleventh annual meeting of the Minnesota State Pharmaceutical Association was held at Lake Minnetonka, June 11, 12 and 13, 1895, the President, C. F. Rhode, presiding. Six sessions were held. The following papers were read :

Historical Notes on the College of Pharmacy of the University of Minnesota Continued from 1894, by Frederick J. Wulling.

On Pharmaceutical Legislation, by H. G. Webster.

On Best Methods for Advertising a Retail Drug Store, by Truman Griffen.

On the Pharmacopœia of the United States and its Value to the Pharmacist, by Charles R. Mærelius.

*Nebraska.*—The fourteenth annual meeting of the Nebraska State Pharmaceutical Association was held at Omaha, June 3 to 6, 1895, the President, Henry R. Gering, presiding. Four sessions were held. The following papers were read :

Should a Standard of Literary Training be required of Applicants for Examination? by Mrs. Belle C. Heilman.

The Art of Pharmacy, by J. H. Loomis.

The Soda Fountain : its Uses and Abuses, by Mrs. Julia C. Hoobler.

The Relationship that should exist between the Doctor and the Druggist, by Theo. St. Martin.

Judicious Advertising for the Retail Druggist, by M. W. Ryerson.

The Fin de Siecle Drug Man, by Mrs. H. N. Shuman.

The Relation that should exist between the Doctor and the Druggist, by George W. Moore.

The Attitude of the Pharmacist and Physician, by A. L. Johnson.

- \* Pepsin and its Manufacture, by Dr. A. E. Dickinson.

*New Hampshire.*—The twenty-second annual meeting of the New

Hampshire Pharmaceutical Association was held at Laconia, September 3 and 4, 1895, the President, Nelson S. Whitman, presiding. Two sessions were held. The only paper read was on the following subject :

\* Is Spirits of Nitre Prepared from the Concentrated Form Official? by Mr. Underhill.

*New Jersey.*—The twenty-fifth annual meeting of the New Jersey Pharmaceutical Association was held at Newark, May 22 and 23, 1895, the President, Geo. W. Parisen, presiding. Three sessions were held. The following papers were read :

\* The Pharmacology of Saw Palmetto : Botany and Materia Medica, by Henry H. Rusby ; Histology, by W. A. Bastedo ; Pharmacy, by Virgil Coblenz.

Examination before Boards of Pharmacy, with a Curriculum for Candidates before the New Jersey Board of Pharmacy, by William C. Alpers.

The Utility of Pharmacognosy to the Student of Pharmacy, by William S. Disbrow.

New Jersey's Contribution to the Literature of Pharmacy from 1870 to 1895, giving the titles of 127 papers read during that period before the New Jersey Pharmaceutical Association, by Fred. B. Kilmer.

The Physician, the Pharmacist and the Common Foe, by H. P. Reynolds.

The National Formulary, by William P. De Forrest.

The Meeting of the Maryland Pharmaceutical Association and some Afterthoughts, by E. A. Sayre.

An Outline for the Study of Materia Medica, by Philemon E. Hommel.

Our Portrait Gallery, being a sketch of the life-labors of the deceased presidents of the New Jersey Pharmaceutical Association, by Howard Prescott Reynolds.

*New York.*—The seventeenth annual meeting of the New York State Pharmaceutical Association was held at Saratoga Springs, June 25, 26 and 27, 1895, the President, Chas. F. Fish, presiding. Five sessions were held. The following papers were read :

Recent Additions to our Materia Medica, by R. G. Eccles.

\* Fluid Extract of Wild Cherry, by Garret V. Dillenbach.

*North Dakota.*—The tenth annual meeting of the North Dakota State Pharmaceutical Association was held at Fargo, August 6, 7 and 8, 1895, the President, Ole Granrud, presiding. Four sessions were held. The following papers were read :

Education of the Apprentice, by Sam Ellingson.

\* Impure Solution of Magnesium Citrate, by A. I. Hidlund.

*Ohio.*—The seventh annual meeting of the Ohio State Pharmaceutical Association was held in Sandusky, June 4, 5 and 6, 1895, the President, C. T. P. Fennel, presiding. Four sessions were held. The following papers were read :

The Food Law (of Ohio), by W. H. Styer.



What is the Law and How ought it to be Enforced? by Nathan Rosewater.

Pharmacy Regulation (A National Pharmacy Law), by Frank Freericks.

\* On Antidotes for Hydrocyanic Acid, by John G. Spenser.

The Everyday Druggist and the Pharmacopœia, by J. H. Beal.

*Pennsylvania.*—The eighteenth annual meeting of the Pennsylvania Pharmaceutical Association was held at Eagle's Mere, June 18, 19 and 20, 1895, the President, Dr. Willoughby H. Reed, presiding. Six sessions were held. The following papers were read :

\* Some Commercial Aloins, by Charles H. La Wall.

\* Laboratory Notes on Peroxide of Hydrogen, Oil of Wintergreen and Oil of Turpentine, by Charles H. La Wall.

Sunday as a Day of Rest, by D. W. Krauser.

Sunday as a Day of Rest, by Dr. C. B. Lowe.

Sunday as a Day of Rest, by Emile Ott.

Some Queries on the Pharmacy Law, by Louis Emanuel.

The Pharmacy Law and its Administration, by Dr. C. B. Lowe.

"Tendencies," by John F. Patton.

A Glance at the Contributions of Dr. Priestley to Pharmaceutical Science, by (his granddaughter) Mrs. S. C. McCoy.

A Record of 1000 Poison Sales, by Emile Ott.

A Country Drug Store, by Samuel H. Hill.

Cataloguing the Drug Store, by Dr. C. B. Lowe.

\* Improvement in the Official Process for Preparing Tincture of Opium, by Emile Ott.

A Tabulated List of *Poisons*, so to be Considered under the Pennsylvania Poison Law, submitted by Emile Ott.

\* On Aromatic Elixir, by Emile Ott.

\* On Sponges, by William B. Burk.

*Tennessee.*—The tenth annual meeting of the Tennessee Druggists Association was held in Monteagle, July 17 and 18, 1895, the President, J. F. Voight, presiding. Four sessions were held. The following papers were read :

Pharmaceutical Education, by E. A. Ruddiman.

\* A Scheme for Extraction and Separation of Active Principles in Preparations and Nostrums, by E. A. Ruddiman.

The Drug Business Generally, by B. H. Gordon.

\* An Arrangement of Crude Drugs for Examination with Low Power of the Microscope, by John S. Wright.

*Washington.*—The sixth annual meeting of the Washington State Pharmaceutical Association was held at Seattle, September 16 and 17, 1895, the President, Robert Marr, presiding. Four sessions were held. The following papers were read :

\* Medicinal Plants to which the Climate and Soil of our State (Washington) are Adapted, by P. Jensen.

Careless Dispensing, by Emil D. Bories.

A Paper (without title) Discussing the Druggist and his Calling, by Dr. Bolink.

## PHARMACY.

### A. APPARATUS AND MANIPULATIONS.

#### WEIGHTS AND MEASURES.

*Weights and Measures, B. P. vs. Metric Weights.*—Wm. Elborne has read a lengthy paper at the meeting of the British Pharmaceutical Conference which constitutes essentially a plea for retention of the present system of weights and measures in the forthcoming revision of the British Pharmacopœia.—Pharm. Jour., Aug. 31, 1895, 183-184 and Sept. 7, 1895, 203-204.

*Metric System of Weights and Measures—Adoption in the United States.*—E. H. S. Bailey contributes a paper on the adoption of the metric system of weights and measures, in which, while advancing no new ideas, he discusses the subject in a practical manner. Accepting the dictum that the metric system of weights and measures is bound to be adopted eventually, the sooner the right steps are taken to familiarize the people with it the better. In Germany, France and Switzerland there was little difficulty in inaugurating the new system, and even our neighbor, Mexico, found a way to do it. The people will, to some extent, retain the old denominations. For instance, it is a common practice to buy groceries by the pound, but that means 500 grams, a value quite near to the pound. In this country, although we have had the decimal money system for so many years, the old terms "shilling" and "bit," are still in use. If all transactions, to be legal, are required to be made in the language of the metric system, it will not be long before people educate themselves up to it. As has been suggested, let the government make the metric system mandatory after July 1, 1897, in its various departments, and a large force of officials will soon become familiar with it, and will, in a sense, act as teachers for the rest of the community. Then, if at some specified time, say January 1, 1900, the new system for all private transactions go into effect, there will be ample time to educate the public before that day.—Amer. Drugg., March 25, 1896, 179.

*Chemical Balances—New Construction.*—Dr. Lewis Kahlenberg describes two new chemical balances made by Paul Bunge, of Hamburg, and used with satisfaction in the laboratory of the University of Wisconsin, which are shown in somewhat imperfect photographs not reproduced here.

The special points of merit appear to be the following: The construction of the beam to secure lightness combined with rigidity; the provision of a plumb-line to show when it is level, and the ease of adjustment; the arrangement to raise the plane up against the middle knife edge, thus lifting the beam from the steel edge upon which it rests when not in use, for which purpose the central agate plane is fixed upon a steel rod that slides inside of the main pillar, and is movable by means of an eccentric fixed on a horizontal rod beneath the balance. The latter rod, upon which are also two other eccentrics that move the pan supports at the same time that the beam is lifted, is turned by means of a small crank. The beam is divided to a scale, supplied with riders, and suitable provision is made for operating these. Agate appears to be used at all available points where there is friction, and, with few exceptions, the material seems to be the same in both balances, though in the one intended for less accurate work there are some slight differences in the shape and combination of the beam.—Pharm. Rundschau.

*Chemical Balance—Novel Form.*—H. Joshua Phillips describes the novel chemical balance shown in the accompanying cut (Fig. 1), which is constructed on the principle of the hydrometer, and may prove useful for certain purposes. It consists of a glass cylinder, upon the top of which can be fixed a portable brass ring bearing two upright



guide-rods of brass, 6 inches high and  $\frac{1}{8}$  inch in diameter. The balance proper consists of gilded brass bulbs into which is screwed an aluminium stem, about  $\frac{1}{16}$  inch in diameter, to the top of which aluminium arms are screwed, perforated at the ends so that the guide-rods can pass through them. Upon the centre of the arms there is a receptacle for a small aluminium pan to hold the substance to be weighed, while underneath the arms are projecting needle points, bent at right angles, which are used in conjunction with the movable needle-point on one of the guide-rods. The cylinder being filled with cold, recently boiled water, the bulbs are dropped in, the guide-rods passing through the perforations in the arms, and the bulbs sinking until they are just covered. Supposing 0.2 Gm. of a substance to be weighed, a 0.2 Gm. weight is placed in the pan, whereupon the bulbs sink to a definite depth, the point being indicated by slipping up the movable pin on the guide-rod until it exactly faces the needle point depending from the arm. The weight is now replaced by the substance to be weighed until the instrument again sinks to the movable point, gently tapping the instrument to remove any friction. The range of weight that such an instrument is capable of recording is of necessity within narrow limits.—Chem. News, July 12, 1895, 15.

*Graduated Measures—Cheap and Convenient Rack.*—A "Practical Druggist" describes the cheap and convenient rack for graduated meas-

ures shown by the accompanying cut (Fig. 2). It is made of a piece of wire one-eighth of an inch thick, shaped to suit the special requirements in regard to shape and size of graduate.—Pharm. Era, March 26, 1896, 386.

*Graduated Feeding Cup—A Convenient Form.*—Becker and Marxhausen have introduced a graduated feeding cup, which is shown by Fig. 3, and possesses the advantages over the ordinary cups in that it may be used both for measuring and administering the medicine accurately and conveniently. The divisions are 5, 10, 20 and 30 Gm., and it is protected by a German patent.—Pharm. Centralh., Jan. 16, 1896.

FIG. 2.



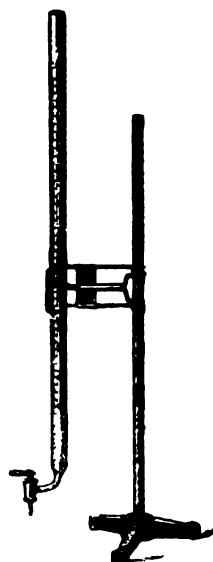
Graduated Measures.

FIG. 3.



Graduated Feeding Cup.

FIG. 4.



a. n. 6

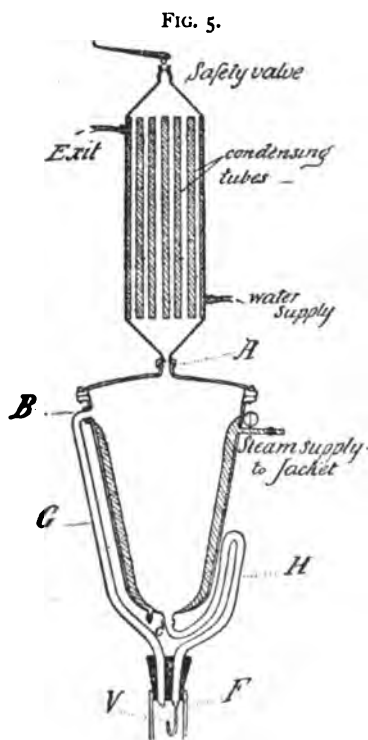
Burette Holder.

*Burette Holder—Practical Construction.*—A burette holder which permits of the inspection of the entire scale is shown by Fig. 4. The clamp is here constructed of nickel wire and metal so as to be movable up and down when not in use, but when the burette is inserted it acts upon the torsion spring, and becoming clamped, it simultaneously fastens the holder to the rod. For larger burettes two of these holders may be used and these may be modified so as to answer a variety of purposes.—Pharm. Centralh., Dec. 12, 1895, 714.

#### SOLUTION.

*Extraction Apparatus—Useful Construction.*—J. H. Hoseason describes a new extraction apparatus which is constructed so as to permit its use for

a variety of purposes, and is shown by the accompanying cuts (Figs. 5, 6 and 7). It consists essentially of a jacketed copper percolator, tinned internally, and of a tubular condenser. The lid of the percolator is fitted airtight by a vulcanized rubber band inserted between the rims and secured by clamps. The screws at *A* and *B* (Fig. 5) are of the same size, so that



Extraction Apparatus.

the tubular condenser can be attached at either position, as shown in Figs. 6 and 7. For the purpose of extraction the apparatus is arranged as in Fig. 6, the details being shown in Fig. 5. The condenser is attached at *A* by a nut, the joint being rendered secure by the insertion of a thin washer. A block-tin tube, *G*, is fitted at *B*, connecting the percolator with the receiver, *F*, and from *C* a block-tin syphon-tube *H*, bearing at its extremity a downward-acting glass valve, *V*, to prevent the hot vapors from ascending, also passes into the receiving flask, the dimensions of the principal parts of the apparatus being as follows: condenser tubes, length, 18 in.; diameter of condenser,  $6\frac{1}{2}$  in.; total length of condenser, 26 in.; depth of percolator from level *B* to bottom, 20 in.; inside diameter at top, 14 in.; at bottom, 6 in.

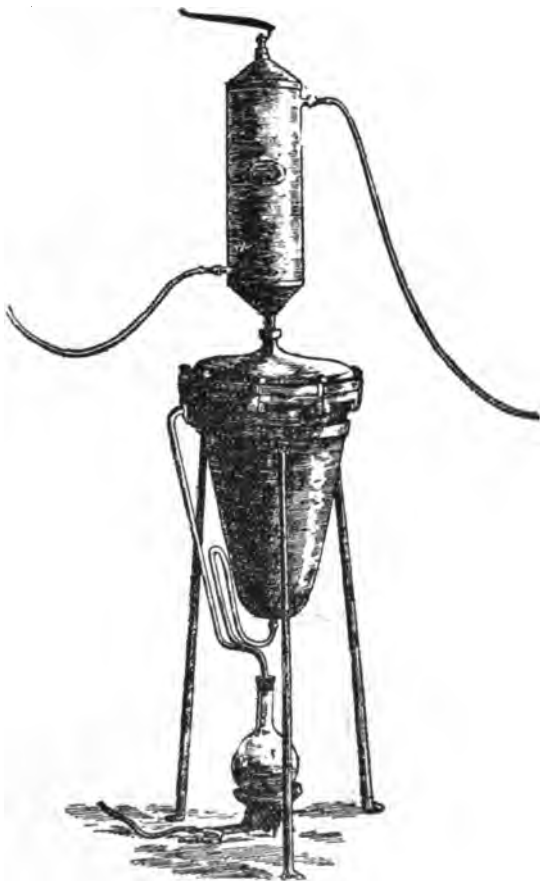
The percolator is prepared for extraction by placing a thin layer of absorbent cotton at the bottom, covering that with a sheet of thick filter paper, and then carefully and evenly packing

the powdered drug. A sufficiency of menstruum—of alcohol 50 to 60 per cent., of ether or liquorice 40 to 50 per cent. of the weight of the drug—is added, and maceration allowed to proceed for twenty-four hours, *A* being closed by a screw cap. The first percolate may then be obtained without the aid of heat by applying the force of an air pump at *A*, and by adding a fresh quantity of menstruum. This process may be repeated if desirable.\* To thoroughly exhaust the drug, another equal portion of solvent is then added, placing three-quarters of the volume in the percolator, and the receiver *F*. The condenser is now attached to *A*, and heat applied to the

\*This first percolate is evidently intended to be removed from the receiver and reserved.—Rep.

flask *F*, the heated air being allowed to escape during the first few minutes by opening the safety valve. The solvent having been raised to the boiling point, the vapors will pass through *G* into the top portion of the percolator, thence into the condenser, whence they flow back liquefied; percolation begins, and the process becomes continuous. The boiling point of the solvent will be lowered, as the apparatus necessarily works under reduced pressure. After the extraction is completed, the con-

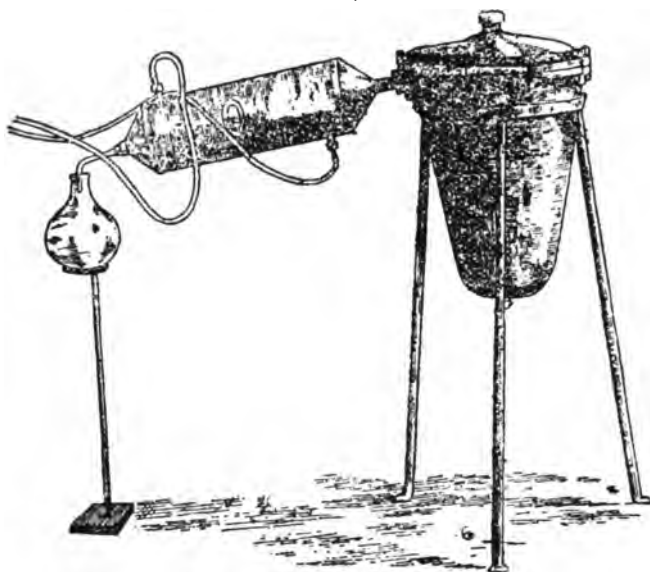
FIG. 6.



Extraction Apparatus.

denser is removed, and pressure by an air force applied at *A* to remove as much of the solvent as possible. To recover the remainder, the side tubes *G* and *H* are removed, the openings *A* and *C* are closed by screw caps, the condenser is attached to *B*, and steam or hot water is passed into the jacket, when distillation will shortly take place.

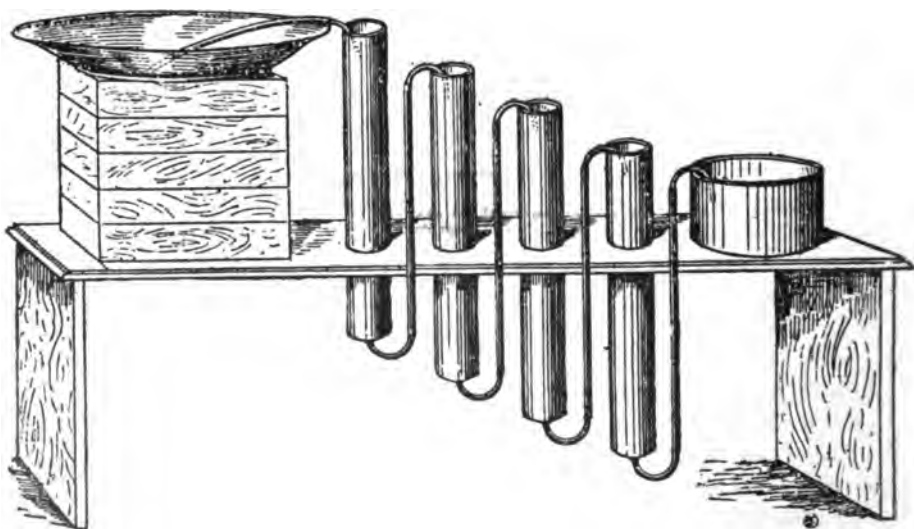
FIG. 7.

**Extraction Apparatus.**

The apparatus is adapted to a variety of pharmaceutical operations, such as extraction by hot solvents, etc., and it may also be utilized as a vacuum pan by attaching an exhaust pump.—*Pharm. Jour.*, June 13, 1896, 477-478.

*Apparatus for Continuous Percolation—Convenient Arrangement.—J.*

FIG. 8.

**Apparatus for Continuous Percolation.**

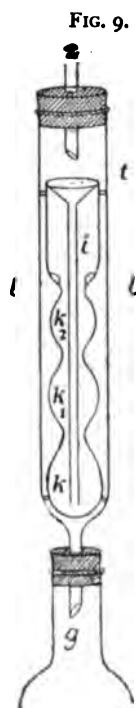
A. Forrest describes the apparatus for continuous percolation and describes the method of its use, which is, however, easily understood by consulting the accompanying cut (Fig. 8). The support is a stout wooden box laid on its side; on the top are circular holes to receive the percolators, which are fixed at the required height by small wooden wedges. The percolators are tins in which platinotype paper is sent out; they are 21 inches long, with a diameter of three inches. The bottom is pierced, and a short length of metal tube soldered into the hole. A piece of rubber tubing of suitable length is attached to the metal tube, and the other end of the rubber tubing carries a piece of bent glass tubing, by which it hangs from the top of the percolator next in the series. To prevent choking, a perforated circular piece of tin, saucer-shaped, is placed in the bottom of the percolator with its concave side downwards, and above this a layer of tow and other suitable materials.—Pharm. Jour., Dec. 28, 1895, 538.

*Apparatus for the Extraction of Liquids by Ether—Construction and Use.*—Van Rijn describes the extraction apparatus shown by Fig. 9, which is suitable for the extraction of fats from milk, or alkaloids from their solutions. It is applied as follows: The liquid to be extracted is placed in the bulb *k*; ether vapors are generated in the flask *g*, and pass through four holes, *l*, into the bulb-tube, *i*, and outside of this into the upright condenser *Z*. The ether here condensed drops into the funnel *t*, which rests on *i*, and reaches to the bottom of the bulb *k* containing the fluid to be extracted; thence it passes upward, accumulating in *k*<sub>1</sub> and *k*<sub>2</sub>, and finally overflows through the holes *l*, and returns to the flask *g*, where the ether is again vaporized by the heat of a water-bath, while the solid, non-soluble fat or alkaloid accumulates.—Pharm. Centralh., Dec. 12, 1895, 714; from Annal. de Pharm., 1895, 295.

#### FILTRATION.

*Filtration—Protection to Volatile Liquids.*—O. A. A. Rouillion describes the following arrangement for filtering volatile liquids: The receiving bottle for the filtrate is placed in a pan containing about 2 inches of water. The filter and funnel being placed in position, a tubulated bell jar is placed over all (the water serving as a water-joint. ? Rep.), and the filter is supplied, as may be necessary, through the tubulure in the bell jar. The arrangement may also be used with heat for the filtration of viscid liquids. Amer. Drugg. Oct. 25, 1895, 258.

*Filters—New Form for Suction Filtering.*—Schleicher and Schüll have

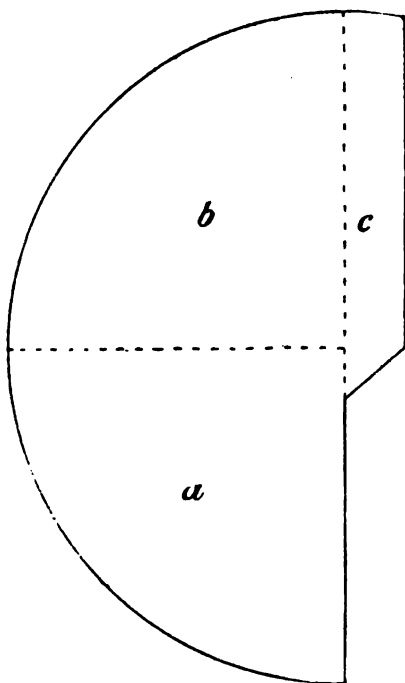


Apparatus for the Extraction of Liquids by Ether.



introduced a new form of filter for which they claim advantages over the ordinary filter used in washing precipitates, and particularly when this is done with the aid of the suction pump. They designate this form (shown by Fig. 10) as *Open Filters*, which are semicircular pieces of the so-called "hardened" filter paper, having a projection extending along the straight edge of the filter to a distance a little beyond half its length. For use the quarter circle *a* is folded so as to cover the quarter circle *b*; the projecting portion *c* being then folded over *a*. On introducing this into the funnel it accommodates itself to any irregularities on its surface, and filtration will proceed without danger of the precipitate being washed away.—Pharm. Centralh., April 2, 1896, 211.

FIG. 10.



Open Filters.

FIG. 11.

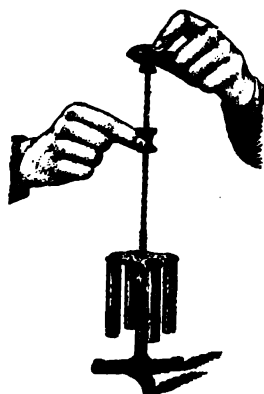
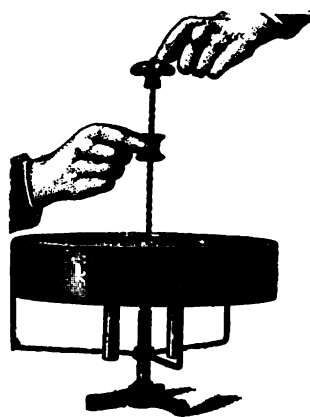


FIG. 12.



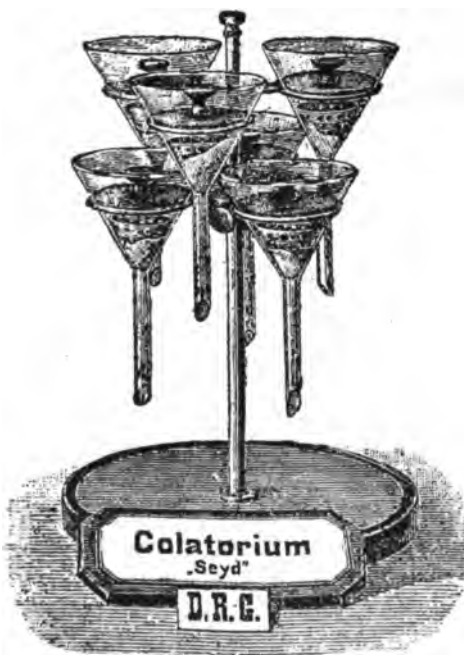
Centrifugal Apparatuses.

*Centrifugal Apparatus—Simple Form for Hand-Operation.*—Dr. Cori describes a simple form of centrifuge, which can be operated by hand.

It is shown by the accompanying cuts (Figs. 11 and 12), the uncovered apparatus being shown in one and the covered apparatus in the other. The rotary motion is imparted by moving the center hand-piece up and down along the prolongation of the axis of the centrifuge, whereby about 1,200 revolutions per minute can be readily obtained.—*Amer. Drugg.*, April 10, 1896, 217; from *Zeitschr. f. Wissensch., Mikroskopie*.

*Colatorium—Useful Construction.*—Seyd recommends an arrangement that appears to be specially adapted for straining mucilaginous infusions, such as that of marsh-mallow root, etc. The straining material consists of a layer of cotton wool backed with muslin, and is sold in rolls. A square piece is cut off, placed in a funnel, wool outwards, kept in position by a perforated cone and protected by an earthenware cover. Six such funnels may be arranged on a stand, as shown by the accompanying cut (Fig. 13).—*Pharm. Jour.*, Feb. 29, 1896, 170.

FIG. 13.



Colatorium.

*Dialysis—New Observations on Osmosis.*—F. M. Raoult has made some interesting observations respecting the osmotic phenomena produced when ether and methyl alcohol are separated by different diaphragms. He found that with a diaphragm of pig's bladder, the methyl alcohol passes by osmosis to the ether side, but the bladder membrane appears to be impermeable to ether. Exactly the reverse occurs with a vulcanized caoutchouc membrane, which is impermeable to methyl alcohol, but permeable to ether. The author's experiments show that osmosis between two determined liquids may not only vary much in energy, but even change its character with the nature of the diaphragm; and that the osmotic movement of substances across the diaphragm may be absolutely independent of their molecular weight and of their condition as dissolved substances or solvent.—*Pharm. Jour.*, Aug. 24, 1895, 169; from *Proc. Paris Acad. Sciences*.

## CRYSTALLIZATION.

*Large Crystals—Systematic Culture.*—R. van Melckebeke prepares large crystals as follows: Very regular detached small crystals are first obtained by immersing linen threads in a saturated solution of the substance, which is allowed to cool very slowly, the crystals being examined with a lens and all imperfect ones removed. The threads bearing the perfect crystals are then again immersed in a saturated solution of the salt, the vessel being covered by a bell jar over a dish containing sulphuric acid. When the edges of the crystals measure four or five millimeters, another saturated solution of the salt is prepared at a temperature much above that of the surrounding atmosphere, filtered, and allowed to stand all night, some small crystalline particles being added so as to avoid over-saturation. The volume of this solution should be proportionate to the size of crystal desired; thus, for a crystal of one kilogramme, three litres of solution should be prepared. The next day the solution is decanted in a confectioner's jar, and towards evening the crystals are immersed in it, at this stage of the operation supported on glass plates suspended in the solution. They are left immersed in the solution until next morning, when they are removed and carefully dried with a fine linen cloth, to be re-immersed and treated in the same way over night until they have acquired the desired size. The solution must be carefully re-saturated during each day, to compensate the loss occasioned by the growth of the crystal over night; but super saturation must be carefully avoided, and must likewise be adjusted in temperature of the surrounding air before the re-immersion of the crystals. To insure the transparency of the latter they may be moistened with alcohol before immersion, the surface layers of air being thus removed. A perfect octahedron of potash alum, weighing two kilogrammes and the edge measuring thirteen and a half centimeters, was obtained by this process in about seven months.—Pharm. Journ., Dec. 28, 1895, 535; from Annales de Pharm. I, 486.

## APPLICATION OF HEAT.

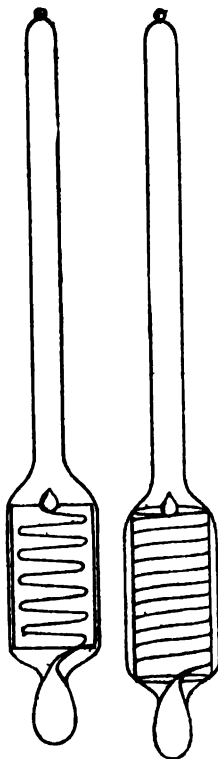
*Thermometer—Its Evolution.*—A writer in "Science Progress" has the following to say concerning the evolution of the thermometer: The origin of the thermometer is lost in the night of time: the father of it is not known. Was it Fludd, 1637? Was it Galileo, 1597? Was it Lanctovius or Father Paul of Cracovi? Lanctovius claims the paternity, and Borelli and Malpighi allow it to him. It was an air thermometer, of no real value. Galileo constructed the first spirit thermometer in 1616 or 1617, and Boyle introduced it into England. This thermometer was not a real vacuum. Hook in 1665 took the freezing point of water as zero, and Boyle suggested the use of distilled water. In 1701 Newton prepared a thermometer with linseed oil; he took melting snow as zero and the temperature of a living animal as 12°. The same year Amontons used

mercury with air. Now appeared Fahrenheit with the first proper mercurial thermometer. Reaumur's came out in 1730, and that of Celsius in 1742. The zero of Celsius was at first at the real  $100^{\circ}$ , his  $100^{\circ}$  marking melting ice. Linnæus suggested the reversal of this order. Mauchenbrock in 1747 invented the first pyrometer, which was improved in 1754 by Desaguliers, and in 1782 by Wedgewood.—West. Drugg., April, 1896, 154.

*Thermometers — Improved Construction for Fractional Distillation, etc.*—O. N. Raikow describes short thermometers with a high scale,

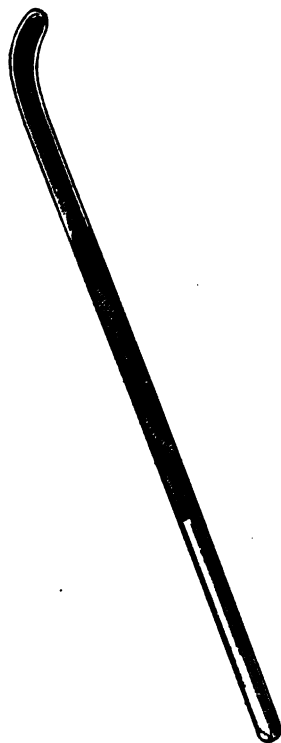
which are recommended particularly for fractional distillations because the mercury column is completely surrounded by the vapor of the distilling fluid, and consequently connections are unnecessary, while the reading of the scale is never inconvenienced by the upper end of it being covered by the cork enclosing it. The mercury capillary may be constructed in the form of a vertical or horizontal zig-zag, as shown by Fig. 14 or spirally, as shown by Fig. 15.—Pharm. Centralh., Dec. 12, 1895, 714; from Chem. Ztg., 1895, 1788.

FIGS. 14 and 15.



Thermometers.

FIG. 16.



Thermometric Stirring Rod.

*Thermometric Stirring Rod—A New and Practical Device.*—Charles H. La Wall describes a convenient form of stirring rod, which enables the operator to note certain temperatures without the use of a thermometer. It consists of a common glass tube about 5.5 Mm. in diameter, outside measurement, and 18 Cm. long, sealed by fusion in the flame of a Bunsen burner at one end, which is slightly bent as shown in the cut (Fig. 16). Some easily fusible material, such as bees-wax, paraffin, etc., is introduced into this tube until, in a molten state, it fills it about three-fourths full; after which the open end is also sealed in the flame, and the stirring rod is ready for use. By the proper selection of material a series of rods indicat-

ing different temperatures may thus be constructed, a range of temperatures from  $40^{\circ}$  to  $90^{\circ}$  C. being readily obtained by using various kinds of paraffins and water. The utility of this new implement will readily suggest itself.—*Amer. Jour. Phar.*, May, 1896, 260 to 261.

*Chromo-Thermoscope—Application of the Color changes occurring in Certain Chemical Compounds at Different Temperatures.*—H. Rebenstorff has made some practical applications of the color changes that occur when certain double iodides of mercury are heated, an observation that has been made with the compound of copper and mercuric iodide by Hess, Weinhold, and others. This compound has a red color at the ordinary temperature, but assumes a brown color when heated above  $70^{\circ}$  C., and returns to its normal color on cooling. Rebenstorff finds another useful double iodide to be the silver-mercuric iodide, obtained as a precipitate when a molecular equivalent of argentum-nitrate is added to a solution of mercuric iodide and potassium iodide in molecular proportion. This compound has a yellow color, which changes at  $45^{\circ}$  to  $52^{\circ}$  C. to a red or orange-red, according to certain variations in its composition, and returns to its original color when cooled to below  $33^{\circ}$ – $28^{\circ}$  C. The thermoscope is produced by coating strips of paper with these substances, such strips when attached to vessels in which chemical reactions are caused to take place showing the variations in temperature by the change in their color. While at present the chromo-thermoscope is used mainly in lecture experiments to illustrate the radiation and absorption of heat, its utility in laboratory operations will doubtless lead to its more extended application.—*Pharm. Centralh.*, May 21, 1896, 311–312.

*Bunsen Burner—New Modification.*—A new modification of the Bunsen burner, shown by the accompanying figures (17, 18 and 19) has been de-



Bunsen Burner.

vised and patented by R. Dierbach. The burner consists of a mixing tube bent at right angle, the longer shank capable of being turned, or moved forward and back in the ring *d* (Fig. 17). This ring is fastened to the iron plate by means of a hinge, so that by turning the hinge, the tube may be made to assume almost any position, as shown in Figs. 18 and 19. Moreover, the function of the tube can be reversed, by unscrewing the portion to which the supply-tubing is attached, and fastening it to the other end.—*Pharm. Review*, May, 1896, 111.

*Spirit Stove—Simple and Efficient Construction.*—A German firm has introduced the elegant and simple spirit stove shown by the accompanying cut (Fig. 20.) A steady stand with four feet carries elevated a brass globe holding about half a pint of spirit. By turning a small valve a little spirit is allowed to flow into a dish below the stand; this is then ignited, but before it is quite burnt out the valve is again turned. The spirit that flows is now converted into vapor, and burns with a blue and intensely hot flame. The cost of the spirit burnt is trifling, and the heat is sufficient to boil a litre of water in from four to five minutes.—Pharm. Jour., Febr. 29, 1896, 170.

FIG. 20.



Spirit Stove.

FIG. 21.



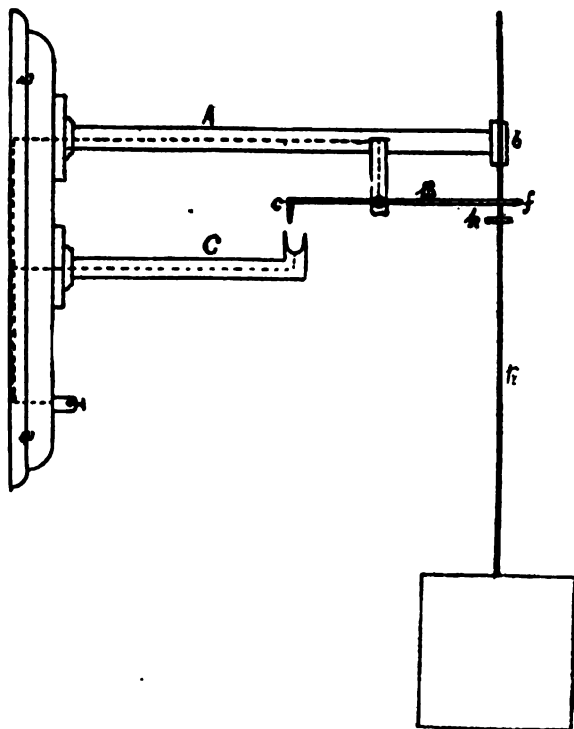
Steam Apparatus.

*Steam Apparatus—Practical Construction for Gas-fuel.*—G. J. Murrel, Pforzheim, has constructed a still and steam apparatus intended to be heated by gas, which is shown by the accompanying cut (Fig. 21.) The gas-stove is made so heavy that it will readily support the cooler suspended from the side. The kettle is so constructed that on removal of the still it may serve as a water bath for evaporating dishes, different sizes being accommodated by a set of ring-lids. By a simple arrangement, the still may be clamped so firmly to the apparatus that distillations under pressure may be made. The jacket is also provided with an arrangement to keep the water at a constant level, while distilled water can be collected during the process of distillation or evaporation that may be in progress.—Pharm. Centralh., Febr. 6, 1896, 79.

*Still Alarm—A Device to Prevent Overflow from Receivers.*—N. Crossley Jones and T. W. Jones have devised an automatic alarm to be attached to the receivers of distillates, which has been successfully used for several years to prevent overflow when the stills are left to themselves temporarily, and which they have therefore named the "still alarm." The device is

shown by the accompanying cut (Fig. 22). It consists of a wooden slab (*w. w.*) carrying two arms (*A* and *C*), which are the terminals of an electric circuit. The upper arm (*A*) finishes in a bearing or guide (*b*) for the vertical float rod (*R*), and also supports a balanced bar (*B*), actuated at the forked end (*f*) by the float rod, so that when the latter is

FIG. 22.



Still Alarm.

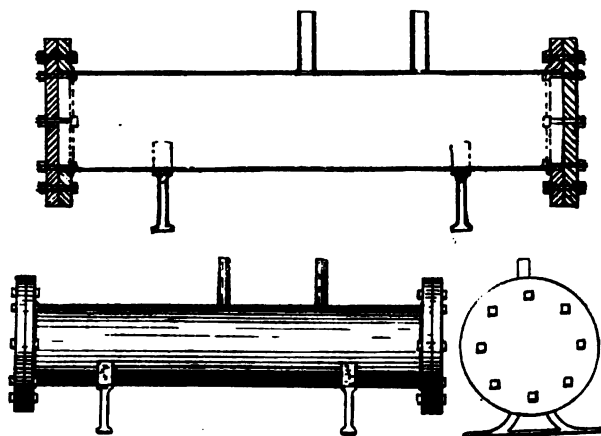
raised to a certain height the circuit is completed by the depression of the contact end of *B* into the mercury cup at the end of the lower arm *C*. When working, the float, which may be made of copper, aluminium, glass, or other suitable material—dips into the receiver, or any adjunct to it which special conditions may render desirable. As the distillate collects, the float, which has already been adjusted to the proper height, in rising actuates the bar *B* by means of a small flange *k*, and so making contact, a bell rings and continues ringing until the receiver is emptied.—Pharm. Journ., Aug. 17, 1895, 140; from Proc. Brit. Pharm. Conf., 1895.

*Whistill Alarm*—A Device to Prevent Complete Emptiness of Stills.—Referring to the “Still Alarm” (see above) of the Messrs. Jones, J. Maltby Clague describes a device of his own which he has successfully used

as a warning of the approaching emptiness of the still in the distillation of water. The still (boiler) was a square one, and in addition to the opening in the top by which the steam found its way to the worm, another was made bearing a one-half or three-eighth inch tube, the lower end of which was open and reached to within three inches of the bottom of the boiler. The upper end protruded about four inches, and to it an ordinary brass whistle was attached, which, when the water was boiled down to below the lower end of the tube, gave a piercing noise due to the rush of steam through it—i. e., "whistled" for more water.—Pharm. Jour., Aug. 31, 1895, 180.

*Laboratory Still for Tar—Cheap and Convenient Construction.*—Edward Kremers describes a still for the distillation of tar in experimental laboratories which is shown by the accompanying cuts (Fig. 23), and which is both conveniently constructed, and cheaper than copper stills

FIG. 23.



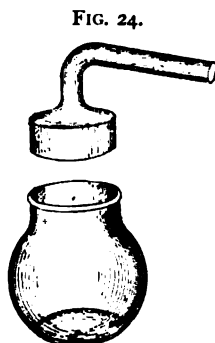
Laboratory Still for Tar.

usually employed. A piece of 8 in. wrought iron pipe, 40 in. long, is threaded for an inch at each end. Both ends are fitted with cast iron flanges, 14 in. in diameter and  $\frac{3}{4}$  in. thick. Heads of same diameter and thickness are bolted to the flanges by  $\frac{3}{4}$  x 2 in. bolts. Two 1 inch pipes lead out of the top of the still. One is used as exit tube for the distillate, the other as a safety tube. The still rests upon two cast-iron legs, its center being 12 inches above the floor. It is heated by a low gas furnace, and large bottles surrounded by cold water are used as condensers. Such a still has given satisfaction during the past year in the distillation of pine tar, and students while working with charges of 10 to 20 kilos, have not met with a single accident.—Pharm. Review, Jan. 1896, 16.

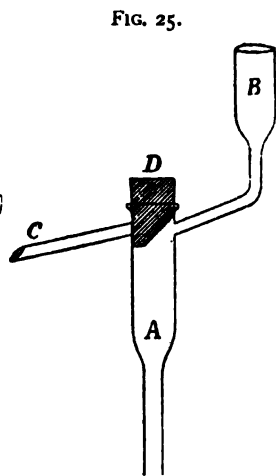
*Combination Weighing and Distilling Flask—Convenient Construction.*—Edward Kremers calls attention to a modification of the evaporating



and weighing flasks (*Abdampfskolben*) supplied for experimental chemical laboratories, which consists in having, in addition to the ground glass stopper provided, also a *ground glass still head* as shown in the accompanying cut (Fig. 24). As these evaporating flasks are now used, there is a great waste of ether, chloroform, and other volatile solvents, which is to a great extent avoided by the modification recommended. After the solvent



Distilling Flask.



Reverse Condenser.

FIG. 25.

is largely secured by distillation, the residue can be completely dried by removing the still head, and continuing the heat in the usual manner. The neck of the still head may be short, so as to facilitate its weighing along with the flask and contents.—Pharm. Review, Jan. 1896, 15.

*Reverse Condensers—Various Constructions.*—C. Mangold describes an arrangement for changing from reverse condensation to direct distillation with

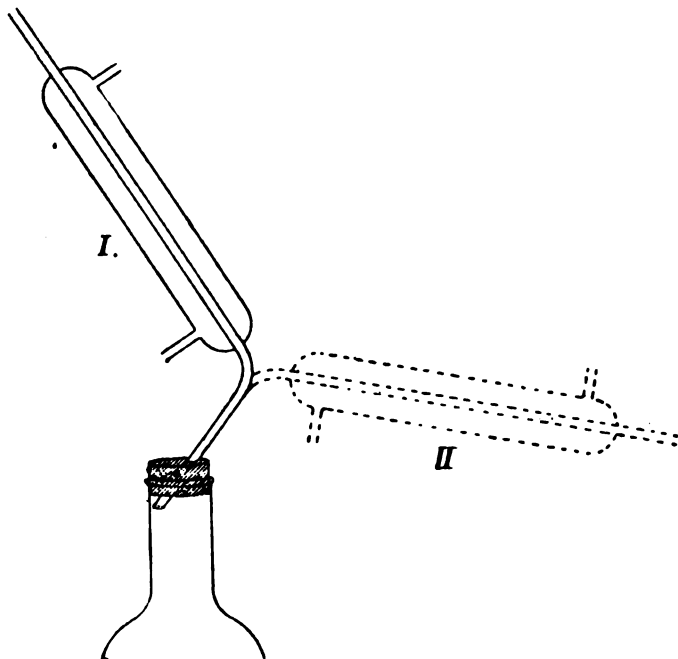
expedition and convenience, which is shown by Fig. 25. A tube *A*, widening out at the top, is inserted in the neck of the flask; it is provided with a tube connected with an upright condenser, and at *C*, with another leading to the descending condenser. Into the opening of the tube *A* a cork stopper *D* is inserted, cut at an angle so that by simply turning this the vapors from the flask will pass into *B* or through *C*. The apparatus, which is constructed both of glass and of metal by C. Desaga, of Heidelberg, may also be used for extractions by placing a Soxhlet extractor upon *B*, and upon this the upright condenser.—Another form of

*Reversible Condenser*, which can be easily and rapidly changed from an upright to a descending position, is described by Van Rijn, and is shown by Fig. 26. Here it is only necessary to bend the condensing tube of a Liebig's condenser at an angle of  $120^\circ$ , and to attach it to the distilling flask by means of a cork bored in the same slant. This application is plainly shown by the cut.—Pharm. Centralh., Dec. 12, 1895, 174; from Zeitsch. Angew. Chem., 1895, and Annal. de Pharm., 1895, 297.

*Liebig's Condenser—Should be Named Weigel's Condenser.*—A. Kahlbaum brings in evidence that the condenser popularly known as "Liebig's Condenser," was invented by Prof. Christian Ehrenfried Weigel in 1774. Liebig himself, in his "Handbuch der Chemie, &c.," describes it as Gött-

ling's condenser ; but Prof. Göttling, of Jena, gave a description of Weigel's condenser (with illustration) in 1794, and designated Weigel as being the inventor.—Pharm. Centralh., March 12, 1896, 163.

FIG. 26.



Reversible Condenser.

*A New Desiccator—Advantageous Construction.*—C. Reinhardt describes the new desiccator shown by Fig. 27, which has been introduced by N. Robert Muencke, of Berlin. It is constructed in two sizes, 8x8 and 15x15 Cm., and the advantage claimed for it over others of similar form is that the entire body can be used for the reception of the substance to be dried. The desiccant occupies the trough surrounding the body of the apparatus. The cover is prevented from sliding off by the raised margin.—Pharm. Review, April, 1896, 88.

FIG. 27.



A New Desiccator.

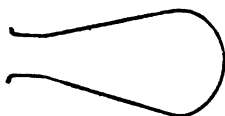
*Exsiccators — Suitable Absorbents.*—H. Kral recommends a mixture of calcined calcium chloride and freshly burnt lime as superior to calcium chloride by itself for the absorption of moisture. A regeneration by again calcining

the mixture is impracticable, but the material is so cheap that it may be renewed at little expense. To replace sulphuric acid in exsiccation the author recommends fused potassium bisulphate as answering quite as well. Its use avoids the danger from accidental spilling, and it possesses the further advantage in that it may be regenerated by fusion.—Pharm. Centralh., Febr. 20, 1896, 105.

*Consistence—Meter—An Apparatus for Measuring the Consistence of Fluids.*—Weiss has constructed a "consistence-meter" which is described as being a disc fastened to a vertical axis and enclosed in a vessel into which the fluid is to be placed. The disc is caused to rotate by means of a cord and weight, the rapidity of rotation being dependent on the greater or less density of the fluid in which it is immersed, and measured or estimated by the aid of a dial attached to the apparatus.—Pharm. Centralh., Jan. 16, 1896, 36.

*Erlenmeyer's Flasks—Construction with Rounded Bottom.*—The firm of Peters and Rost, Berlin, have recently introduced Erlenmeyer's flasks with rounded bottoms, as shown by Fig. 28. The utility of flasks of this shape is obvious.—Pharm. Centralh., Dec. 12, 1895, 714; from Chem. Ztg., 1895, 2041.

FIG. 28.



Erlenmeyer's Flask.

*Caoutchouc Utensils—Preservation.*—Coester states that caoutchouc utensils are preserved for years if they are placed in a 3 per cent. solution of carbolic acid. Wide-mouthed glass bottles, with ground stoppers, are the most suitable containers.—Pharm. Centralh., Oct. 3, 1896, 574; from Aertzl. Centr. Anz.

#### MISCELLANEOUS APPLIANCES.

*Corks—Presence of Ammonia.*—Van Ledden Hulsebosch and Willen have made an examination of corks for the presence of ammonia, and conclude that while there are occasionally present small traces of ammonia, Professor Liechti was in error in attributing the change of color in Nessler's reagent to ammonia, since according to their investigation the color produced is due to the presence of tannin.—Amer. Chem., Jan. 25, 1896, 45; from Schw. Wochenschr. f. Pharm.

In rejoinder, the "Schweiz. Wochenschr. f. Pharm." observes that from a practical point of view it is immaterial whether the reaction upon Nessler's reagent is due to ammonia or to tannin, for in either case it vitiates the results of a chemical reaction in water that has been in contact with corks. In view of this fact it is therefore desirable to follow the instructions issued by the Association of Swiss Analytical Chemists to the effect that all corks before being used for stoppering water intended for analysis should be boiled in water for some time.—Ibid., Feb. 10, 1896, 80.

*Labels for Poison Containers—Method of Producing White Letters on Black Ground.*—The following method for producing white characters

upon a black ground, suitable for poison bottles, is recommended in "Pharm. Ztg." The inscription is written (or traced) upon white paper with a mixture of equal parts of glycerine and mucilage of gum arabic. When completely dry, the paper is completely coated with black printer's ink by means of the roller, and when the ink has penetrated the paper, the surface is washed with a wet sponge, which removes the printer's ink from the traced or written characters, to which it does not adhere.—Pharm. Centralh., Dec. 26, 1895, 750.

*Poison Bottle—A New Form for the Shop and for Dispensing.*—Harry

A. Waas describes the poison bottle shown by the accompanying cuts (Figs. 29 and 30), which, he says, is both a convenient and practical safeguard, and is intended for shelf-bottle as well as for prescription use. The bottle (Fig. 29), is provided with the usual lip and a screw-thread at the base. An aluminium, or better, a glass cap *B*, with a small neck at top, screws on to this, and fastens a cork washer *C* when the bottle is to be closed. A cork *A* is inserted into the small neck of the screw cap, and serves simply as a protection, since on its removal the liquid or contents cannot be poured out, it being necessary to remove the entire screw-cap for this purpose. The bottle fitted securely for dispensing or storing is shown by Fig. 30.



Poison Bottle.

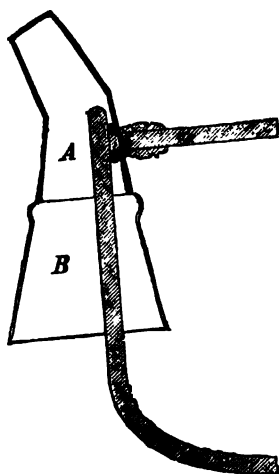
The cost is very little over that for ordinary prescription bottles, and the device is equally adapted to salt-mouthed ware.—Merck's Rep., Jan. 15, 1896, 31.

*Show Bottles—Coloring with a Gelatin Film.*—T. Maltby Clague has tried various coatings for show bottles as a substitute for the solutions usually employed, and has succeeded to prepare such a coating satisfactorily by the aid of gelatin. For a five-gallon bottle or carboy, he directs that 1 ounce of clear gelatin be soaked in part of 6 ounces of water, from 15 to 25 grains of aniline dye dissolved in the remainder of the water warmed, the two mixed, heated until the gelatin is melted, and 1 dram of carbolic acid added. When the solution has cooled to about 150° F., it is poured into the bottle, the bottle is placed in a warm posi-

tion until it has acquired a temperature of  $90^{\circ}$  to  $100^{\circ}$  F., and then removed, keeping it turned upside down and round about until the gelatin shows signs of setting; it is then allowed to stand at rest so that the jelly not adhering to the sides may settle at the bottom. Malachite green (25 grs. to 6 oz.) makes a satisfactory color, strikingly like copper sulphate solution; methylene blue (15 grs.) produces a rich ammonio-sulphate of copper color; methyl violet (15 grs.) gives a rich bluish red, varying according to the shade used; Flamingo (15 grains) gives the nicest red tried; Browns, with Bismarck brown, yellows, with methyl orange, are not so satisfactory.—*Pharm. Jour.*, Jan. 11, 1896, 22.

*Carboy-Emptier—A Practical Device.*—M. Eichersheimer has constructed a convenient contrivance for emptying carboys without danger of spirting, which is shown by the accompanying cut (Fig. 31). It consists

FIG. 31.



Carboy-Emptier.

of a soft-rubber collar *B*, to which the hard-rubber mouth-piece, *A*, is attached. The short horizontal hard-rubber tube, *C*, enters the mouth-piece laterally, and is attached at right angle to the bent tube, *d*, which reaches to near the bottom of the carboy. The collar *B*, being slipped over the neck of the carboy, air is admitted through *C* and *d*, and on inclining the carboy at a proper angle the liquid flows out quietly and without the slightest danger from spirting.—*Pharm. Centralh.*, Jan. 3c, 1896, 60.

*How to Open A Pharmacy.*—A very interesting paper "by one who has done it" is published in "*Chemist and Druggist*" (Jan. 25, 1896, 123-128), in which the author goes into details respecting the space required, the character of the furniture, fixtures, containers and utensils, the drugs, chemicals, prepara-

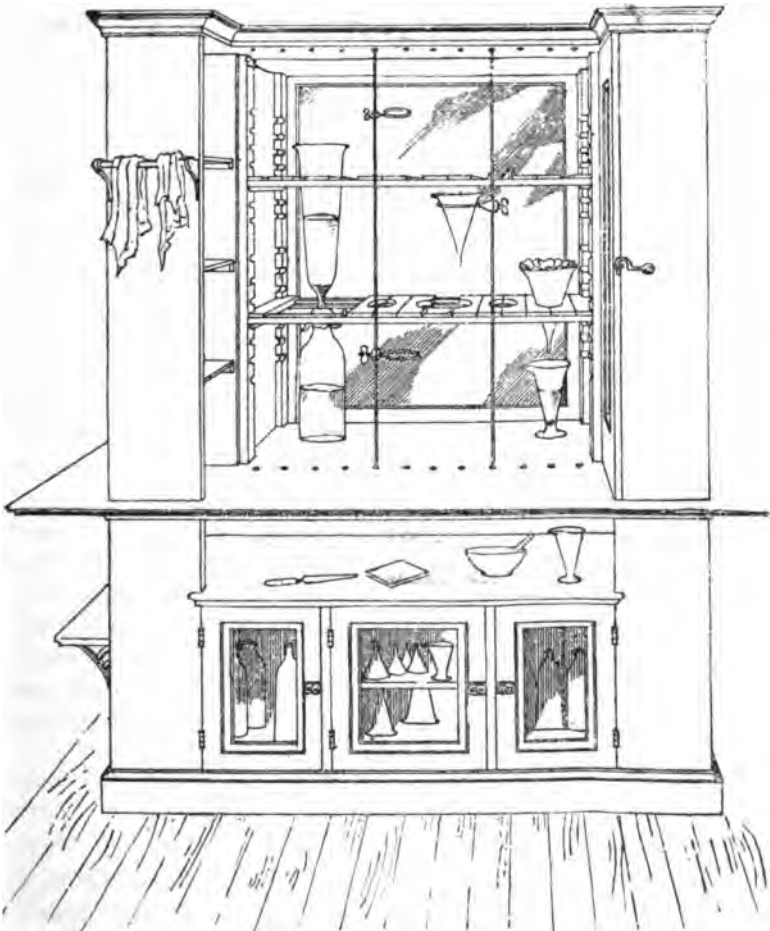
tions, patents, and sundries, etc., required for the complete outfit of a shop at a cost of £400. The paper, which is illustrated by a handsome drawing of the interior of the shop, is, of course not suitable for abstraction; but attention is called to it here as giving to American pharmacists an idea of what is considered necessary in England to establish a complete pharmacy with moderate means.

*Shop Arrangement—Practical Suggestions.*—A "*Practical Druggist*" makes some suggestions with respect to the petty annoyances that are daily encountered in the average drug store. It is not the hard work that the druggist has to do, but the worry that accompanies it, that makes him sick and tired of the business at times. According to his idea of business, the little word "system," if established and closely adhered to, will do

away with worry to a great extent. The author's suggestions are in this direction, and will be read with profit by beginners as well as by those who have in a long experience failed to grasp the importance of systematizing the details of shop routine.—See *Pharm. Era*, March 26, 1896, 386.

*Manufacturing Case—A Convenient Arrangement for the Dispenser.*—W. C. Burns endorses the remarks of the "Practical Druggist" above referred to, and describes as a part of his "system" the manufacturing case shown by the accompanying cut (Fig. 32). This, he says, is for

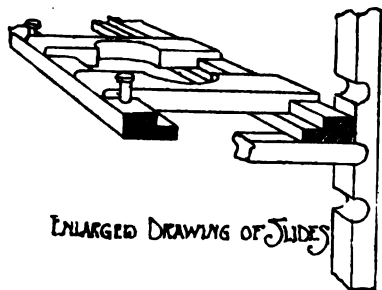
FIG. 32.

**Manufacturing Case.**

simplicity, economy of space, and systematic arrangement hard to beat ; in it he can do all the manufacturing required for a large retail business, and he can have a dozen or more preparations under way at the same time,

which in no wise interfere with each other. Maceration, percolation and filtration may be conducted at the same time. The case is an extension of the prescription case, an advantage which enables the attention to the

FIG. 33.



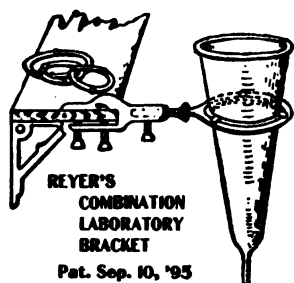
ENLARGED DRAWING OF SLIDE

regular prescription business without losing sight of the operation under way. The slides, an enlarged drawing of which is shown by Fig. 33, are made so as to be adjustable to any size of percolator or funnel; the frames are made so that they may be raised or lowered as required; two iron rods are put just in front of the slide frames, and on these any number of rings may be placed and at the same time moved

to any position across the case, as shown by the holes in the cut. Shelves are provided to the left of the case, a closet for the finer apparatus to the right, and shelves and closets are also provided beneath for uses that readily suggest themselves to the practical druggist.—Pharm. Era, May 21, 1896, 639.

*Combination Laboratory Bracket—A New Device.*—Taking advantage

FIG. 34.

REYER'S  
COMBINATION  
LABORATORY  
BRACKET

Pat. Sep. 10, '95

of the shelf as a support, Emil Reyer has devised (and patented) a support or bracket which may be very securely fastened to a shelf (as shown by Fig. 34). by means of two set screws. In the hollow arm a projection of the ring is enclosed and may be given any position from vertical to horizontal by means of the set screw which holds it firmly. The ring proper is fitted with a series of smaller rings, so that an opening of any desired diameter may easily be obtained for any vessel not exceeding

the usual dimensions.—West. Drugg., April, 1896, 167.

## B. PREPARATIONS.

### GENERAL SUBJECTS.

*The U. S. Pharmacopœia of 1900—Proposition to Introduce Doses and New Synthetic Remedies.*—Dr. Charles Rice, in a paper read before the Section on Materia Medica and Pharmacy of the American Medical Association, at the Atlanta Meeting, after reviewing the criticisms on the Pharmacopœia of 1890 that have been made since its appearance in 1893, discusses the propriety of introducing doses and some of the new synthetic remedies into the next Pharmacopœia (1900). It is certain, he observes

among other points made, that the work would be more frequently consulted by the physician, and be of more practical value to the pharmacist, if it gave information concerning the average doses of the several articles. The absence of doses has frequently been complained of, and is, really, one of the most serious obstacles to the general popularization of the work. The charge of willfully omitting doses, however, cannot be laid at the door of the Committee of Revision, because it was distinctly ordered by the last two Pharmacopœial Conventions not to insert doses into the Pharmacopœia. The blame, if there be any, must be shouldered by the medical profession, whose representatives deemed the introduction of doses unwise upon ground that appeared to be justified. Respecting the introduction of some of the new synthetic remedies, the author propounds the question whether we shall permit ourselves to be instrumental in bringing about a condition of affairs when the physicians and pharmacists will have to seek for information regarding the remedies most generally used in other books outside of the Pharmacopœia, and if it is not time to inquire whether the conditions connecting these remedies with the patent and copyright laws are of such a nature as to place them beyond the ethical boundary? Surely if the large majority of medical practitioners in this country does not deem it objectionable to prescribe such drugs as phenacetin, antipyrin, sulphonal, aristol, salol, homatropine, etc., are we not justified in considering the supposed ethical barrier broken down? Foreign pharmacopœias have long recognized and admitted a number of these synthetic products, either under specially coined names, or those by which they are universally known and sold. There is no advantage gained by coining for them new names, for the latter will but rarely be used in actual practice. The plain, honest way—to call them by their common names—is the best. The two themes which the author suggests as worthy, among others, of consideration, and regarding which it is very desirable to obtain the sense of the medical profession, are the following :

1. It is proposed that the next Committee of Revision shall be authorized to state the average dose in connection with each drug or preparation used internally. The doses shall be designated by a sub-committee consisting of those members who are practitioners of medicine, and shall be given in such form as will leave full liberty to the prescriber to exceed the limits given.

2. It is proposed that the next Committee of Revision be authorized to introduce into the Pharmacopœia any compound or preparation whose composition, properties and mode of manufacture are known, and when identity, purity and strength can be ascertained by tests irrespective of any proprietary rights that may be connected therewith.—*Amer. Drugg.*, June 10, 1896, 335-336.

*The Pharmacopœial Standard—Question of Practical Application in Certain Cases.*—J. U. Lloyd writes interestingly on the standard estab-



lished by the U. S. Pharmacopœia for some of the substances and preparations that are defined by it or for which formulas are given. While it is evident that the aim was to make the work as precise and thorough as possible, still the fact has developed that the very precision and thoroughness of the work may furnish a source of hardship to those whom it was intended to aid, on account of its being looked upon as the legal code by persons who are appointed to enforce laws regulating the purity of drugs. He, therefore, regards it a vital oversight that a large number of the exacting descriptions were not qualified, inasmuch as, in many cases, these were from one side too precise and in others were applicable only to preparations at one point of their existence and at no other. He calls attention to some of these defects and oversights, which have heretofore had no existence, considering them in three classes and selecting a few specimens in each class.

Under CLASS A, preparations are considered which begin to change immediately and continue to alter during keeping so that the original condition, however correct, cannot be maintained. Examples of these are :

*Liquor Sodæ Chloratæ*.—A lot of this, prepared during October, and assaying 2.56 per cent. available chlorine (U. S. P. = 2.6 per cent.), showed a gradual diminution, so that in January it assayed only 1.87 per cent., and in May was reduced to 1.78 per cent. of available chlorine.

*Liquor Plumbi Subacetatis*.—(U. S. P. = about 25 per cent. of lead subacetate) contained when prepared in April 25.19 per cent., September, 23.40 per cent., and in May following had been reduced to 22.94 per cent. of lead subacetate.

*Acidum Sulphurosum*.—(U. S. P. = not less than 6.1 per cent. by weight of gaseous  $\text{SO}_2$ ), contained in February, 6.67 per cent., and in May following, 6.08 per cent. Another lot was transferred in March to three 5-pint bottles, assaying 5.92, 5.89 and 5.80 per cent. respectively. When opened during May, these three samples assayed 5.62, 5.57 and 5.62 per cent. respectively.

*Aqua Ammonia Fortior*.—(U. S. P. = 28 per cent. by weight of gas), fell during a period of four months from 26.5 to 25.51 per cent. when kept in cork-stoppered bottle, while a lot protected with a rubber stopper showed no loss. Similar results were obtained with *Spiritus Ammonia* and with

*Aqua Ammonia*.—(U. S. P. = 10 per cent. by weight of gas). In the latter case, however, the author tried the experiment of keeping one lot hermetically sealed with paraffin in a g. s. bottle, and the other the mouth of the bottle was simply covered by laying a cork upon it. Here the hermetically sealed bottle was reduced from 8.22 per cent. to 7.84 per cent., while the loosely covered bottle fell during twelve months to 4.83 per cent.

Under CLASS B, two examples are given of preparations in which the

qualities demanded by the pharmacopœial description are such as to render their production impractical or unnecessarily expensive. Thus, in the case of

*Liquor Ferri Subsulphatis* and *Liquor Ferri Tersulphatis*, the boiling liquid may be "free from nitrous odor," and still not stand the test for the absence of nitric acid demanded. It is an easy matter to exclude either an excess of nitric acid, or of ferrous salt; but it is impracticable to eliminate them both, a slight excess of the one or the other remaining.

CLASS C constitutes substances used largely in the arts for which the demands of commerce, necessities of manufacture, or custom, have established qualities at variance with the U. S. P. standard, and for which it may not be wise to establish unqualified standards other than those hitherto established by the Pharmacopœia. Thus:

*Calx Chlorata* (U. S. P. = not less than 35 per cent. available chlorine) is difficult to obtain of uniform quality, the average of samples examined at one time being 20.51 and at another 31.47 per cent. available chlorine. Of

*Calx Sulphurata* (U. S. P. = at least 60 per cent. CaS) it may be said that all attempts to obtain this of pharmacopœial quality were ineffectual. Two samples showed, the one less than 30 per cent., the other more than 30 but less than 45 per cent.

*Caustic Potash* (U. S. P. = 90 per cent. KOH) was examined in thirteen samples, none of which came absolutely to the standard, one containing 89.60 per cent., two a fraction over 86 per cent., one 82.74, and the remainder various percentages down to 74.93 per cent. And so, three samples of

*Caustic Soda* (U. S. P. = 90 per cent. NaOH) contained respectively 91.8, 85.54 and 82.77 per cent. of sodium hydrate.

The author's observations lead him to the conclusion that in justice to the druggists, no less than in justice to those whose duty it is to enforce food and drug laws, a scale of reasonable variations should be applied by the pharmacopœial committee to every pharmaceutical preparation.—*Amer. Jour. Pharm.*, June, 1896, 297-305.

*Galenical Preparations—Scheme for Examination and Separation of Active Principles.*—E. A. Ruddiman proposes a scheme for the examination of galenical preparations and nostrums and the separation of active principles from them, which is based upon the one given in Blyth's work on poisons, and modified for the use of the general pharmacists. Three portions are taken. The first is subjected to distillation under various conditions (acid and alkaline); the second to the action of various solvents under conditions of neutrality, acidity and alkalinity; and in the third portion the inorganic constituents are determined after complete oxidation of the organic contents. For the details of the method, reference must be had to the author's paper in *Proc. Tennessee Drugg. Assoc.*, 1895, 25-26.

*Non-secret Remedies—The Pharmacist His Own Manufacturer.*—S. J. Vanderbilt gives some practical advice concerning the preparation of various remedies to take the place of the proprietary remedies called for. He advises that, instead of buying the so-called "non-secret" remedies, the pharmacist should prepare them himself, and gives practical formulas for quite a number of such as in his experience have had large demand, with the directions that should be printed on the label. The list embraces formulas for the following: headache cure, corn cure, toothache cure, cholera remedy, healing salve, cough cure, anodyne liniment, worm syrup, sarsaparilla, toilet lotion, and bed-bug poison, several formulas for each being given in some cases. Many of these are familiar formulas, and reference must therefore be had to the original communication by those who may be interested in them, in Merck's Rep., Jan. 15, 1896, 29-30.

#### AQUÆ.

*Aromatic Waters—Practical Observations.*—Ferd. Lascar contributes a practical paper on the preparation of aromatic waters. Of the different processes that have been recommended and are in use, he decides in favor of that discarded in recent editions of the Pharmacopœia, depending upon the division of the volatile oil with magnesium carbonate. The objection that a very minute quantity of alkali enters into the product, he regards of minor importance, this danger existing to some extent also in the use of calcium phosphate for this purpose. In an experience covering many years, he has never found traces of alkali to interfere with the utility of aromatic waters, while the products were in all cases superior with regard to taste and aroma to those obtainable by any other method. Possible objections to the presence of traces of alkali may occur in these waters that are used for collyriums, such, for example, as rose or camphor water; but these can be easily provided for by other processes, which, while not yielding so highly aromatic products, are free from even traces of alkalies. The author considers numerous practical points concerning the selection of oils, preservation of the water, etc., and gives it as his opinion that of the two methods that have been considered by the Committee of Revision of the U. S. Pharmacopœia, that of shaking the oil with hot water and then filtering is preferable to that adopted in the revision of 1890, which directs the use of calcium phosphate.—*Drugg. Circ.*, Nov., 1895, 256.

*Aromatic Waters—Practical Observations.*—A writer in "American Druggist" (Jan. 10, 1896), makes some practical observations respecting the preparation of aromatic waters. He says that with each succeeding Pharmacopœia some changes are made in their preparation. None of the methods, however, yield a water that will keep well. Of other methods proposed, the author wishes to record his preference for paper pulp with which to absorb the oil, and the use of warm (but not hot) water.

This, he says, is an easy way of preparing the ordinary aromatic waters in any quantity wanted for immediate use, but the waters so made do not keep well and soon lose their aromatic properties. The use of good distilled water, either for this process or for the various processes of the Pharmacopœia, is urged as a necessity. The process of preparing aromatic waters by distillation is doubtless a good one, but the products do not keep notably better than those made by pharmacopœial methods. On the whole, he thinks the method of distilling the volatile oil in excess with water, so that the oil may separate afterwards in the container, and syphoning the water—which clarifies on standing—as it is wanted, is the best method of preparing aromatic waters. He approves the introduction into the U. S. P. of rose water and orange water distilled and obtained during the manufacture of the respective volatile oils, and observes in this connection that both waters will keep better if the containers are loosely stoppered; or if the stopper is removed occasionally so as to admit air. He cites cases in which the water, having been hermetically sealed, had lost its fine flavor, which was restored by withdrawing the cork and allowing access of air for several days. The use of

*Concentrated Aromatic Waters*, in this connection, deserves some attention. These, he observes, are advocated in England and on the Continent, and are claimed to yield, extemporaneously, waters that correspond in all essentials to the official aromatic waters. A formula published some years ago, directs the preparation of an alcoholic solution of the essential oil—f.3vi oil to f.5iv alcohol—of which one ounce is added to half a gallon of distilled water and the whole allowed to stand until the excess of oil separates. The author considers this process satisfactory enough. Waters so made will be found superior in flavor and keeping qualities to any in which an excess of oil is not used. The proportions of this formula have been used with satisfactory results in the preparation of waters by distillation, as before mentioned.

*Aromatic Waters—Unsatisfactory Method of Preparation*—Frank Edel observes that of the three different methods of preparing aromatic waters from volatile oils, viz., that of the intervention of magnesium carbonate (U. S. P., 1860), with absorbent cotton (U. S. P., 1870), and with precipitated calcium phosphate (U. S. P., 1890), the last named is doubtless the most satisfactory. Nevertheless, it is not entirely so, and he believes that "every pharmacist who has had occasion to keep aromatic waters on hand has experienced more or less trouble on account of their proneness to go wrong." He has, however, found waters like cinnamon, peppermint, etc., to keep perfectly if distilled with an excess of oil, and allowed to remain in contact with the excess until ready for use—the water being syphoned out from beneath the oil as required. The waters so prepared are better and keep better than those made by the U. S. P. process.

—Amer. Drug., Nov. 11, 1895, 279.

*Aromatic Water—Preference to the Method of Hot Solution.*—Alex. Boyd, after trying the various methods for preparing aromatic waters, decides in favor of the simple process of dissolving the volatile oil in boiling water. The oil being placed into a stone jar of twice the capacity of the water to be made, the water is added at a boiling temperature, the whole shaken thoroughly, and when cold filtered through a bed of pulp packed in a percolator. Presuming the oil to be pure, it is essential that it should be fresh. Waters prepared in this way have a better aroma than when

prepared by the intervention of insoluble media.—Chem. and Drugg., March 14, 1896, 378.

FIG. 35.



Container.

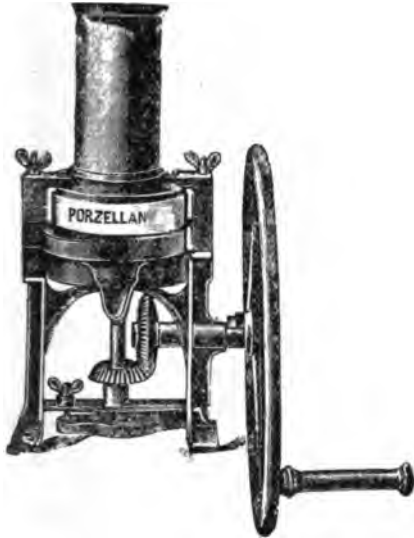
*Aromatic Waters—Preparation by Simple Solution.*—Gove S. Taylor recommends the preparation of aromatic waters from the volatile oils by simple solution under violent agitation at the ordinary temperature, employing an excess of oil and keeping this in contact in the storing vessel, from which a moderate supply is removed from time to time as needed for the shelf bottle. By immediately refilling the stock vessel a constant supply of fresh and fragrant aromatic water is secured, and the process made continuous. For heavy oils, such as cinnamon or wintergreen, a bottle stoppered in the ordinary way will answer, the water being simply decanted, and filtered if necessary. For light volatile oils, the latter floating upon the surface, the container should be provided with a cork bearing a long and a short tube, as shown in the accompanying cut (Fig. 35); the long tube reaching to the bottom of the container, its outer end being bent at an angle to facilitate pouring out; the shorter serving for the admission of air when pouring out the water. The proportions of oil to water recommended by the author are

1 dram to the pint in the case of heavy oils, and  $\frac{1}{2}$  dram to the pint in that of light oils. Camphor should be employed in the form of very small fragments, not in fine powder.—Drugg. Circ., Dec. 1895, 279.

*Concentrated Peppermint Water—Formula*—J. F. Brown communicates the following formula for a concentrated peppermint water, or rather an essence from which peppermint water may be made by the addition of one

to forty parts of water: Dissolve 4 drachms of oil of peppermint in 5 ounces of alcohol, shake with 1 drachm kieselguhr (silica) and add gradually 3 ounces of distilled water. Shake at intervals for three days, filter, and make up with proof spirit (diluted alcohol), if necessary, to 8 ounces. — Chem. & Drug., July 20, 1895, 102.

FIG. 36.



Ointment Mill.

## CERATA ET UNGUENTIA.

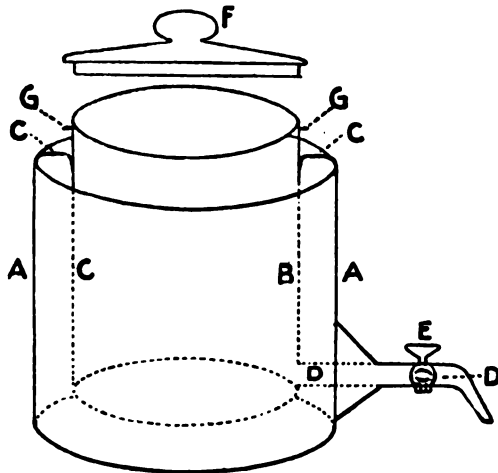
*Ointment Mill—A Practical Apparatus.*—August Zensch, of Wiesbaden, has invented an ointment mill, which is shown in the accompanying cut (Fig. 36). It is constructed either entirely of iron, or—for salves that cannot be brought in contact with iron—with grinding surfaces of hard porcelain, and is stated to enable the rapid production of perfectly smooth ointments. Its price is said to be held so low that it pays

to employ this apparatus even for the preparation of the smaller quantities of ointment required in ordinary pharmacies.—Pharm. Centralh., Dec. 19, 1895, 728.

*Ointments—Water Bath for Melting and Bottling.*—

W. C. Alpers describes a water bath (see Fig. 37), which he uses for melting and bottling petroleum ointments. The bath consists of two cylindrical tin cans, the inner having a capacity of about a quart and being provided with a cover. It is suspended by means of tin straps at the top in the center of the outer can, with a space of about  $\frac{1}{2}$  to  $\frac{3}{4}$  inch all around between the sides and bottoms of the two cans. The inner can, which contains the oint-

FIG. 37.



Water Bath.

ment, is fitted with an outlet tube at one side, and this tube passes through the outer can and is provided with a stop-cock. Mr. Alpers finds this apparatus very useful in bottling all kinds of ointments, and also in bottling castor oil during cold weather. He has furthermore found it to be of service in preparing

*Oxide of Zinc Ointment.*—The oxide of zinc being first triturated to a smooth paste with a small quantity of lard oil, the requisite amount of benzoinated lard, together with a little wax to compensate for the oil used in making the paste, is melted in the apparatus, and allowed to run in a small stream into the mortar containing the zinc paste, stirring constantly until the whole has been added and an ointment of uniform consistence results.—*Amer. Drugg.*, Febr. 25, 1896, 122; *Merck's Rep.*, March 15, 1896, 136-137.

*Ointments—Various Suggestions with Special Reference to the B. P. Revision.*—R. H. Mitchell communicates a paper on the ointments of the B. P. and some new ones, which gives some useful observations.

*Ung. Chrysarobin* is not always a smooth ointment, but may be made satisfactorily by rubbing 20 grains of chrysarobin with 60 minims of glycerin, and then adding 1 oz. avoidupois of melted benzoated lard.

*Ung. Hydrargyri*, made according to formula suggested by Mr. Gerard—2 p. mercury and 1 p. each of hydrous wool fat and benzoated lard—is best made by triturating the mercury with a melted mixture of the fats, than by using one of the fats first for the extinction of the mercury and then adding the other.

*Ung. Ichthyoli* is a desirable ointment, which may be made by incorporating 80 grains of sulphoichthyolate of ammonium with  $\frac{1}{2}$  oz. each of hydrous wool fat and benzoated lard.

*Ung. Pot. Sulphuratis*, if made fresh by the following formula, leaves nothing to be desired: 30 grains of sulphurated potash are powdered, rubbed smooth with 40 minims of alcohol, and rubbed in a mortar with 1 oz. of melted benzoated lard until cold.

*Ung. Resinae* is absurdly stiff, a better formula than the B. P. being: Resin, 8 ozs.; yellow wax, 4 ozs.; olive oil, 16 ozs.

—*Chem. and Drugg.*, Dec. 14, 1895, 858.

*Lanoline Ointment Base—Formula.*—"Galen Jr." has found the following preparation to take up considerable quantities of water in addition to glycerin, and considers it a useful as well as elegant ointment base: Lanolin, 1 part; white petrolatum, 2 or 3 parts. This will readily take up 4 parts of glycerin, and when perfumed with oil of rose, constitutes an elegant and permanent toilet preparation. It, furthermore, forms elegant ointments with boroglyceride, with tar, ichthyol, cocaine, resorcin, etc., and the author believes it to be an ointment base that is suitable for a wide range of substances.—*Amer. Drugg.*, Oct 10, 1895, 216.

*Lanolin Salves—Various Formulas.*—George J. Miller gives a number of formulas for preparing cosmetic and dermatological ointments from lanolin, among which the following :

*Lana Toilet Cream.*—1 Gm. borax ; 0.25 Gm. neutral soap ; 10 Gm. lanolin ; 89 gm. rose water.

*Cold Cream.*—15 Gm. expressed oil of almonds ; 15 Gm. rose water ; 20 Gm. lanolin.

*Crème de Concombre.*—5 Gm. expressed oil of almonds ; 30 Gm. fresh cucumber juice ; 15 Gm. lanolin ; 0.05 Gm. vanillin.

*Crème Céleste.*—15 Gm. lanolin ; 15 Gm. yellow vaselin (American) ; 15 Gm. orange-flower water ; 10 drops terpeneol.

*Ointment for the Hands.*—2.5 Gm. boric acid ; 7.5 Gm. oxide of zinc ; 25 Gm. lanolin ; 15 Gm. olive oil.

*Cooling Ointments.*—(I) 25 Gm. lead water ; 20 Gm. lanolin ; 5 Gm. olive oil. (II) 30 Gm. lime water ; 20 Gm. lanolin ; 10 Gm. yellow vaselin (American). (III) Same as (II) substituting vinegar for lime water. (IV) 2 Gm. liquid thiolum (?Rep.) ; 25 Gm. distilled water ; 20 Gm. lanolin ; 3 Gm. olive oil. (V) 2 Gm. borax ; 50 Gm. distilled water ; 30 Gm. lanolin ; 18 Gm. yellow vaselin (American).

*Hebra's Ointment.*—10 Gm. lead plaster ; 7 Gm. lanolin ; 3 Gm. yellow vaselin (American). Melt together, stir until cool, and triturate the next day until smooth.

*Covering Paste.*—10 Gm. each of oxide of zinc, olive oil, and lanolin.

*Sulphur Paste.*—10 Gm. each of oxide of zinc, sulphur and silicious earth ; 20 Gm. olive oil ; 15 Gm. lanolin ; 35 Gm. distilled water.—Pharm. Centralh., Jan. 16, 1896, 35 ; from Monatsh f. prakt. Dermat. 1895, 13.

*Ointment Base—Formula Suitable for Hot Weather.*—"Cyx" suggests the following formula for a good ointment base, suitable for the hot season or for tropical climates : Vaseline, 2 p. ; lanolin, solid paraffin, of each 1 p.—Pharm. Centralh., Jan. 9, 1896, 16.

*Mercurical Ointment—Quick Process.*—L. A. Harding recommends the following formula for the expeditious preparation of mercurical ointment : Place 2 drachms of powdered benzoin into a bottle with 2 drachms of ether, shake well, add 1 oz. oil of sweet almonds and 16 ozs. of mercury, and shake the mixture with a rotatory motion, when presently it will gather into a perfect mass, leaving the bottle perfectly free from any adhering mercury or fat. Its contents may now be poured out into a mortar, incorporated with a quantity of the official mixture of suet and lard, and afterwards with the remainder of the mixture—in all 15 ozs.—tritulating until the mercury is completely extinguished. In this way, the process may be completed in less than two hours. The benzoin is not alone useful in expediting the process, but acts also as a preservative.—Amer. Drugg., May 25, 1896, 297.



Referring to Mr. Harding's formula for making mercurial ointment, C. S. N. Hallberg observes that the present official formula is quite as expeditious as the one proposed, if not more so, and leaves nothing to be desired. The only modification that he would suggest is that after the mercury has been triturated with the oleate, about 5 per cent. of the mixed fats be added and trituration continued, whereby the extinction of the mercury will be greatly facilitated. In the official process it is the solid oleate and not the free oleic acid that may be present that causes and expedites the extinction of the mercury.—*Ibid.*, June 10, 1896, 326.

*Mercurial Ointment.—Extinction of Mercury by means of Decoction of Saponaria.*—E. Bartis recommends that strong mercurial ointment be prepared as follows: 500 Gm. of mercury are shaken with a few grams of a strong decoction of saponaria root until no metallie globules remain visible to the naked eye. This is then poured into the already prepared and partially cooled ointment body.—*Amer. Drugg.*, June 10, 1896, 334.

*Mercurial Ointment—Proposed Formula.*—G. J. Miller highly recommends the following formula for mercurial ointment: Mercury, 33.3 Gm.; wool fat (lanolin), 44.7; yellow vaselin, 12.0; neutral olive oil potassa soap, 10.0 Gm. The soap odor may be covered with some perfume. The author expresses the opinion that the so-called mercurial eczema is due, not to the mercury, but to the free fatty acids present in the ointment as ordinarily prepared.—*Pharm. Centralh.*, Feb. 6, 1896, 74; from *D. Med. Ztg.*, 1896, 59.

*Mercurial Ointment—Pharmaceutical Test.*—Barnard S. Proctor suggests the following tests for the mercurial ointment of the B. P., which, with suitable modification, may be adapted to the preparations of the other Pharmacopœias: Two samples of mercurial ointment are put into a flask with 2 drams of benzol, 2 drams of water,  $\frac{1}{4}$  dram potassium iodide, and 23 grains of iodine. The mixture is warmed to melt the ointment, and then shaken until the iodine dissolves. If the ointment is of proper strength, the brown color should disappear, and the resulting liquor should be turbid and rather dirty looking, but not brown.—*Pharm. Jour.*, Nov. 30, 1895, 456.

*Ointment of Oxide of Zinc—Improved Formula.*—In reply to a query, H. P. Menard recommends the following formula for ointment of oxide of zinc, which yields a product that has received favorable comment on account of its smoothness, whiteness, firmness during the heated term, and permanence: Triturate  $3\frac{1}{2}$  drams of Hubbuck's oxide of zinc to a smooth paste with 2 drams of white vaseline. Melt 1 dram of white wax and  $10\frac{1}{2}$  drams of dehydrated lard together, stirring until nearly cold, when add the zinc and vaseline to complete the ointment.—*Proc. Georgia Pharm. Assoc.*, 1895, 40, 41.

*Selenium Ointment—An Efficient Substitute for Sulphur Ointment.*—

Dumont recommends selenium in place of sulphur as more efficient in ointments as follows: Selenium, 2 Gm.; unguentum paraffini, 30 Gm.—Pharm. Post, 1895, No. 41; Pharm. Centralh., April 23, 1896, 259.

*Eucalyptus Ointment—Preparation from the Leaves.*—J. Bosisto observes that an ointment of eucalyptus containing simply the volatile oil does not supply the full virtues of its vegetation for ointment purposes. Of the numerous species, all of which contain medical or sanitary properties, none possess an emollient principle in any degree equal to that of *Eucalyptus amygdalina*, which, in conjunction with the oil, produces an ointment of considerable importance, and he recommends the following formula for its preparation: Eucalyptus leaves, green or dried, of the *Amygdalina* species, 1 lb; prepared lard, 2 lbs; yellow wax, 2 ozs. The leaves are crushed into a coarse powder, added to the melted lard, allowed to simmer for two hours, and strained. The melted wax is then added, and the ointment allowed to cool gradually. When *dried* leaves are employed it would be advisable to add one ounce of *E. amygdalina* oil to the ointment obtained as above.—Pharm. Jour., March 21, 1896, 224.

*Eucalyptus Ointment—Improved Formula.*—Peter Boa suggests that eucalyptus ointment should be made from soft paraffin (m. p. 103° F.), 14 parts, and eucalyptus oil, 1 part. Such an ointment melts at about 102° F., while the B. P. ointment, made from hard paraffin (m. p. 126° F.) and soft paraffin (m. p. 103° F.), has a melting point of 106° F. The soft paraffin should be just melted before adding the oil.—Pharm. Jour., Dec. 28, 1895, 539.

*Cold Cream.—New Formula.*—O. A. A. Rouillion recommends the following formula for the preparation of a cold cream that keeps well in all kinds of weather. White petrolatum 18 ozs.; spermaceti, 4 ozs.; white wax, 1 oz.; water, 8 ozs.; otto of rose, 6 drops; solution of soap with benzin, 4 drams. The "soap solution with benzin" is made by saturating cold water with white castile soap; this is then shaken with an excess of benzin, and the mixture emulsified. It is then allowed to stand until the excess of benzin evaporates, when the latter is poured off and the clear solution of soap only used. The "cold cream" is made by melting the wax, spermaceti and petrolatum over a water-bath and stirring into the melted mixture the water to which the soap solution has been previously added. The otto of rose is added when the ointment has become partially cool under constant stirring.—Amer. Drugg., Oct. 25, 1895, 258.

*Cold Weather Salves, etc.—Various Formulas.*—Dr. B. C. Boech recommends a number of salves, creams and jellies that serve a useful purpose as applications during cold weather.

*Ointment for Broken Chilblains.*—Melt together 6 ozs. each of yellow wax and olive oil (best); then add 6 ozs. oil of camphor (linimentum camphoræ? Rep.), and finally 3 ozs. of diluted solution of sub-acetate of lard.

*Glycerin Cream*.—Melt together 1 oz. white wax, 3 drams of spermaceti, and 8 ozs. of sweet almond oil, and add to the melted mixture, little by little, a solution of 4 drams of borax in 1 oz. of orange-flower water and 3 ounces of glycerin, stirring constantly. Finally add 5 drops of oil of neroli, and 3 drops of oil of rosemary.

*Carbolated Glycerin Jelly* is made by soaking 1 oz. of gelatin in 3 ozs. of water for 12 hours, then heating it in a water bath until solution is effected, adding 16 ozs. of glycerin, and lastly, 1 dram of carbolic acid, 2 drops of oil of rose, and 10 drops of oil of lavender.—Amer. Drugg., Oct. 25, 1895, 251.

*Fragrant Quince Cream—Formula*.—Dr. B. C. Boech gives the following formula: Dissolve 8 grains of boric acid in 1 pint of water, macerate 3 drams of quince seed in the solution for three hours, and press the mucilage through a straining cloth; then add to it 4 ozs. of glycerin, 20 grains of carbolic acid, and 4 ozs. of glycerite of starch, and mix well. Mix 40 drops of oil of lavender and 4 drams of cologne water with 4 ozs. alcohol, add the mixture to the mucilage, and mix the whole thoroughly.—Amer. Drugg., Oct. 25, 1895, 251.

*Carbo-Hazel Salve—Formula*.—C. E. Brattles gives the following formula: Carbolic acid (95 per cent.), 1½ fl. dr.; solid extract of witch-hazel, zinc oxide, of each, 4 dr.; petrolatum, 9 oz. Rub the zinc oxide with a small quantity of the petrolatum previously melted, the extract separately with the remainder: mix the two and add the carbolic acid drop by drop under continued trituration, until a well-finished ointment is produced.—Merck's Market Rep., Aug. 15, 1895, 331.

*Ointment and Powder for Eczema—Formulas*.—Dr. Frank H. Barendt recommends an ointment and a powder for the treatment of localized eczema. The *ointment* is made by mixing together equal parts of zinc oxide, starch, lanolin and benzoinated lard; the *powder*, by mixing intimately equal parts of finely powdered zinc oxide, starch and talc. The paste or ointment is spread thickly over the affected area, then covered with bandages, the ointment being renewed from time to time. As the eczema improves, the ointment is discarded, and the dusting powder is liberally applied—in the case of the hands, by copiously dredging into the fingers of the gloves, which must be worn during the entire treatment. Wetting of the bandages or dressings should be carefully avoided.—Chem. and Drugg., Jan. 4, 1896, 15; from Provincial Med. Jour.

#### CHARTÆ.

*Litmus Paper—Necessity of Using Purified Litmus*.—Frank Edel observes that it is not always easy to make a good litmus paper with the litmus ordinarily sold. If, however, the pharmacist will go to the trouble of purifying the litmus and follow the directions of the standard text-books

for the preparation of purified litmus, or if he prefers to purchase the purified article, which is now readily obtainable, he will have no difficulty to prepare a reliable and extremely sensitive paper by following the directions given in the U. S. Pharmacopœia.—*Amer. Drugg.*, Nov. 11, 1895, 279.

*Paraffined Paper—History of its Introduction and Manufacture.*—The *Amer. Jour. Pharm.* (Aug., 1895, 422-424), gives some interesting information respecting the introduction and manufacture of paraffined paper, which is an American improvement on waxed paper. The latter was made by dipping sheets of paper into melted bees-wax, and was not an article of commerce, being made only by those who found it applicable in their own enterprises. But in time the true value of this commodity began to be appreciated, so that about 1865 the firm of Mellor and Rittenhouse conceived the idea of manufacturing it for sale. About this time, also, paraffin began to claim some attention, and the firm decided to substitute paraffin for the more costly bees-wax, producing a more beautiful and cheaper paper. This not alone replaced the old waxed paper, but gradually found new uses, so that now it has become almost indispensable for many purposes. At first it was made by impregnating sheets of paper spread upon heated surface, with paraffin, but with the increased demand, the firm in 1877 invented a machine which greatly facilitated its manufacture. Since then others adopted this machine (which was not patented), while various other machines have been patented, giving rise to much litigation, until the various firms (the one mentioned not being interested), formed a trust, turning out from six concerns in various parts of the United States about \$400,000 worth of paraffin paper annually.

*Magnesium Paper—A Convenient Medium for Producing Flash Light*—According to "*Papier Zeitung*," magnesium paper, which is quite safe, keeps well, and produces a brilliant light on lighting one end of a strip, is prepared as follows: powdered magnesium is sprinkled over impermeable paper covered with starch paste, and dried face to face. After drying, a sheet covered with potassium chlorate is pasted on each side of the first sheet, and another sheet serves as a covering for the whole, which now forms a thick layer which is cut into strips.—*Pharm. Jour.*, June 6, 1896, 446.

*Fly Paper—Preparation without Arsenic.*—The following formula for preparing fly paper without arsenic is given in "*Pharm. Centralh.*" (Aug. 15, 1895, 402): Dissolve 5 parts of potassium bichromate and 15 parts of sugar in 60 parts of water, add a solution of 1 part of volatile oil of pepper in 10 parts of alcohol, and impregnate unsized paper with this mixture, and allow it to become dry.

*Sticky Fly Paper—Various Formulas.*—The following formulas for preparing a mass suitable for "sticky fly paper" are given in "*Western Druggist*" (March, 1896, 118):

*No 1.* Resin, 150 ; linseed oil, 50 ; honey or beeswax, 20 parts.

*No 2.* Resin, 100 ; rapeseed oil, crude turpentine, of each 50 ; honey, 10 parts.

*No 3.* Resin, 100 ; Venice turpentine, 200 parts.

*No 4.* Linseed oil, a convenient quantity. Boil the oil in an iron kettle in the open air until it catches fire. Allow it to burn until a drop, removed from the kettle, draws out into a fine thread ; then allow to cool. The fly-glue is now ready, but if too thick it may be reduced by a little oil of turpentine. The addition of a little beeswax will assist in attracting flies.

#### ELIXIRIA.

*Elixirs—Various Formulas Suggested for the "National Formulary."*—H. W. Preissler has used the formulas of the "National Formulary" in his business, and has found them to be acceptable to physicians in his locality. He has found it necessary, in order to meet the demand of physicians in his locality, to devise several formulas for elixirs, which he now offers for adoption in the National Formulary :

*Elixir Chloral Hydrate Compound.*—Extract cannab. ind., extract hyoscyamus, of each, 16 grains ; pot. bromide, chloral hydrate, of each 4 oz. ; fluid extract licorice root, 1½ oz. ; distilled water, enough to make 16 ozs. Mix.

*Elixir Bromides.*—Pot. bromide, sodium bromide, ammon. bromide, of each, 5 grains ; elixir adjuvans, N. F., 1 fl. dram. Mix.

*Elixir Salicylic Acid Compound.*—Acid salicylic, 640 grs. ; soda bicarb., 480 grs. ; glycerin, 4 ozs. ; distilled water, 4 ozs. Make a solution and add : pot. iodide, 256 grs. ; fluid extract cimicifuga, 4 drachms ; fluid extract gelsemium, 2 drachms ; compound spirit of orange, 1 drachm ; alcohol, 4 ozs. ; simple syrup, sufficient to make 16 ozs. Mix.

*Elixir Black Haw Compound.*—Fluid extr. black haw, fluid extr. cramp bark, fluid extr. squaw vine, of each 640 minims ; fluid extract of Jamaica dogwood, 480 minims ; fluid extr. hydrastis, fluid extr. black cohosh, of each 320 minims ; fluid extr. hyoscyamus, 64 minims ; pot. bromide, 160 grs. ; elixir adjuvans, N. F., sufficient to make 16 ozs. ; mix. —Proc. Kentucky Pharm. Assoc., 1895, 52-55.

*Elixirs, Cordials and Bitters.—Various Formulas.*—A writer in "Amer. Drugg." (March 10, 1896, 147), communicates a number of practical formulas which have stood the test of time, among which the following :

*Neutralizing Cordial.*—May be made by one of the following two formulas : Rhubarb, 2 ozs ; potassium bicarbonate, 2 ozs ; hydrastis canadensis, 1 oz ; Ceylon cinnamon bark, 1 oz. ; white sugar, 4 lb. ; brandy 1 gal. ; oil peppermint, 20 M. Macerate the rhubarb, hydrastis, and cinnamon in four pints of the brandy for six hours, then percolate, finishing with the remainder of the brandy. Dissolve the oil of peppermint and sugar in the brandy and

lastly add the finely powdered potassium bicarbonate. By the second formula—which differs radically from the first—1 drachm of potassium bicarbonate is dissolved in a mixture of  $\frac{1}{2}$  oz. of tinctura rhei aquosa, 15 drops of essence of peppermint and sufficient aromatic elixir to make 4 oz.

*Astringent Diarrhœa Cordial* is made from 2 ozs. cascara sagrada bark,  $2\frac{1}{2}$  drachms each of catechu, myrrh and rhubarb, 5 drachms each of Ceylon cinnamon bark and saffron, 1 oz. of zedoary, 1 oz. of sugar, with sufficient distilled alcohol to make 2 pints.

*Purgative Bitters*, by extracting 14 drachms each of cascara bark and rhubarb and  $1\frac{1}{2}$  drachms each of zedoary, gentian and wormwood, with a mixture of 7 parts of alcohol and 3 parts of water, sufficient to make 2 pints.

*Orange Bitters* is made by macerating for eight days, with occasional agitation,  $6\frac{1}{2}$  ozs. of bitter orange peel, 10 drachms each of cinnamon bark and potassium carbonate in 2 pints of sherry wine, filtering and dissolving in the filtrate 5 drachms each of extract of gentian, extract of wormwood, extract of red clover and extract of cascarilla. Two formulas are given for

*Elixir Calisaya*.—The first of these directs the use of alcohol and glycerin for the extraction of the ingredients in such proportion that the resultant preparation cannot be what is contemplated—an elixir. Evidently there is a mistake. The second formula may find place here. Cinchona bark, 2 oz.; sweet orange peel, 1 oz.; cinnamon bark, 6 oz. (6 drachms ? Rep.); angelica seed, caraway seed, cochineal, of each 2 drachms; coriander seed, 6 drachms. Percolate with 3 pints of diluted alcohol, and add to the percolate 20 ozs. of simple syrup and enough water to make 5 pints.

*Elixir of Blackberry* is made with 2 oz. of blackberry root, 1 drachm each of cloves and cinnamon, and sufficient aromatic elixir to make 1 pint by maceration and percolation.

*Aromatic Elixir U. S. Pharm.*—*Suggestion to Prepare it Directly from the oils*.—Emile Ott suggests that the preparation of aromatic elixir be direct from the volatile oils, instead of from compound spirit of orange, which is used in no other preparation of the U. S. Pharmacopœia, and gives the following formula as furnishing a satisfactory preparation: Oil orange,  $\frac{1}{2}$  drachm; oil lemon, 8 drops; oil coriander, 2 drops; oil anise, 1 drop; syrup, 375 Cc.; deodorized alcohol, 250 Cc.; distilled water, sufficient to make 1000 Cc.; precipitated calcium phosphate, a sufficient quantity. To be mixed and finished according to the directions of the U. S. Pharmacopœia. In the discussion following the reading of this paper, Mr. McIntyre observed that it is found better to measure a large quantity than a small one—as for instance one drop of oil of bitter almond—and that it is easier to measure 10 minims of spirit. Also, that it is better to

preserve these oils in alcoholic solution, which, Mr. Clippe states, was the idea that governed the framers of the formula. Mr. Ott also gives the following formula for an elixir that serves well as a substitute for

*Curacoa* when this is not specially required to be the imported article : Talc, 15 Gm. ; oil of bitter orange, 10 drops ; oil of almond (volatile, Rep.), 1 drop ; oil of cloves, 1 drop ; oil of cinnamon, 1 drop ; alcohol, syrup, of each 360 Cc. ; water sufficient to make 1000 Cc. The oils are triturated with the talc, then the alcohol, syrup, and water are added in the order named, the mixture shaken in a bottle, allowed to stand 24 hours, and filter through paper.—Proc. Pennsylvania Pharm. Assoc., 1895, 142–143.

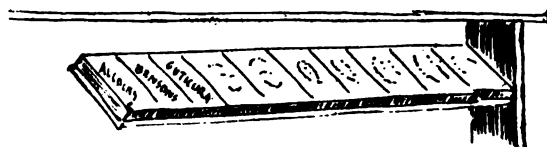
*Kola Elixir—Formula*.—The following formula for kola elixir is given in "Chem. and Drugg." (May 23, 1896, 749) : Macerate for a week, powdered kola 2 ozs., in glycerin 14 drachms, rectified spirit 10 drachms, cinnamon water 6 ozs., essence vanilla 1 drachm, tincture of orange 1 oz. ; then filter. The quantity of vanilla may be increased.

*Chartreuse-Liqueur—Formula*.—Süss gives the following formula for preparing a liqueur corresponding to the far-famed "Chartreuse" : Herba tanacetæ, 8 Gm. ; folia menthæ piperitæ, 1 Gm. ; folia melissæ, 1 Gm. ; fructus anisi vulgaris, 1 Gm. ; fructus anisi stellati, 1 Gm. ; crocus, 0.3 Gm. ; cortex fructus citri recens, 0.5 Gm. ; alcohol, 1 liter. Macerate for 24 hours at 80°, strain, and add to the strained liquor a cold syrup made by dissolving 1 kilo of sugar in 1 liter of water.—Pharm. Centralh., Jan. 2, 1896, 13 ; from Pharm. Ztg.

#### EMPLASTRA.

*Plasters—Convenient Arrangement*.—Arthur B. Burrows describes a convenient arrangement for shelving ready-spread plasters, as follows : Take a board as wide as the length of the boxes in which these plasters are modernly supplied to the trade, and long enough to hold eight or ten of them placed side by side. Remove the plasters from the boxes and fasten each box to the board by means of carpet-tacks ; then replace the

FIG. 38.



Plasters.

plasters in the boxes, and secure the shelf thus made under the counter, or in any other convenient place, tilting it at an angle of about thirty degrees, so that the tops of the boxes may be readily visible, as shown in the illustration (Fig. 38).—Merck's Rep., Nov. 15, 1895, 465.

*Plaster-spreading—Practical Observations.*—Since the introduction of machine-spread plasters the preparation of plasters by hand upon the prescription of physicians has become almost a lost art, and practical observations upon this now more or less obsolete manipulation are therefore the more welcome. G. T. Nagle observes that a good plaster when spread should remain soft, pliable, and adhesive, and ought not to melt at the temperature of the human body. When plasters are kept for any length of time they are liable to become hard and brittle, and it is therefore necessary to protect them from air as much as possible by placing antiseptic muslin over the face of the plaster and afterwards storing in suitable cardboard boxes or iron presses. Hardened plaster may be softened by lightly brushing the surface with spirit of camphor or olive oil and gently warming. While leather (split skins) is most used for spreading plasters on, it serve the best purpose when the plaster is to be applied to the sound skin; but for abraded surfaces the plaster to be applied is best spread upon muslin. The best shapers for plasters are those made from sheet tin, and a liberal stock of them should be kept in every pharmacy. They are most expeditiously removed after the plaster has been spread, and no fastening or nailing of the plaster to the counter is necessary. The most convenient plaster-iron is that heated by gas inside the blade. Finally, when sending out a plaster the surface should be covered with antiseptic muslin, over which is placed a sheet of stearin paper with printed directions for its removal before application, the whole being enclosed in a cardboard box.—Chem. and Drug., April 25, 1896, 579.

*Liquid Adhesive Plaster—Preparation and Use.*—Heusner recommends a liquid adhesive plaster for extension-bandages of felt, prepared according to the following formula: Cera flava, 10; resina damar, 10; colophonium, 10; terebinthina, 1; æther, 55; alcohol, 55; oleum terebinthinæ, 55. It is applied to the part by spraying, and the felt bandage—the outer surface of which is coated with strong linen—is then applied and wrapped tightly first with dry and then with moist gauze bandaging.—Pharm. Centralh., Oct. 10, 1895, 588; from Wien. klin. Rundsch., 1895, 614.

*Rubber Plasters—Method of Preparation.*—H. W. Medberry has delivered an address upon the manufacture of plasters before the students of the Chicago College of Pharmacy, in which he described briefly the history of plasters, and gave some details concerning the manufacture of the modern rubber plaster. The base of these is pure Para rubber, and much is dependent upon the quality of this product. The operation of preparing this crude substance as received for its ultimate purpose of grinding, mixing, and spreading on cloth, requires powerful machinery, and much skill, such as goes only with thorough training and experience, to produce a plaster that is satisfactory in every particular. Attention must be given to every detail, and it is pointed out by the author as a fact that the same ingredients, working formulas and machines given to one plaster maker,



and all details followed to the letter, may produce a worthless plaster mass in his hands, while in other hands it would be perfect in every particular. The important points to be considered in making these goods are: 1. combination of medicinal ingredients compounded with the proper base in such manner as to produce a perfect plaster that will not spoil in any climate. 2. Medicinal properties, to insure the desired result for which the plaster is used. 3. Adhesive properties, so that the plaster will adhere firmly and at the same time will permit the ready removal of the face cloth. The first step is the preparation of the rubber. It is steeped in hot water to soften it, and is then passed between two corrugated rollers, called a washer or crusher, where it is subjected to severe pressure, while a stream of water continually flows through it, removing all dirt and foreign matter. The rubber comes out in sheets, which are hung on steam coils for seven or ten days to dry, and are then ready for use. The next preliminary operation is mixing the gums and Burgundy pitch, resin, wax, etc., which form the compound. These ingredients are melted on a steam bath and are strained for the purpose of removing all dirt and foreign matter. The compound is then mixed with the extract or other medicinal agent required, and incorporated with the sheet rubber by passing repeatedly through heavy steel rollers, and while being ground through these rollers, orris root is incorporated with the other ingredients for the purpose of disintegrating the rubber fibres, which prevents the mass from running together after being spread out on the cloth. The mass is then laid on zinc-covered tables and is ready to spread on the cloth. This is done in a calender—a machine weighing 17 tons, which has three massive steel rolls or calenders through which the cloth is run, and which is set on a rock foundation on account of its tremendous weight to prevent vibration during the plaster-spreading process. Here, by suitable aids for gauging the thickness of the layer, the plaster-mass is spread upon the cloth by being fed between the rollers, is wound upon a large reel, afterwards cut into suitable strips, and perforated if required porous.—West. Drug., March, 1896, 105-106.

#### EMULSA.

*Cod Liver Oil Emulsions—General Observations.*—Prof. Gay has studied the various methods proposed for the preparation of cod liver oil emulsions, and discusses the subject in a practical way. He concludes that the retail pharmacist cannot employ mechanical apparatus, but use simply the mortar and pestle for emulsification. As to emulsifying agents, he gives preference to gums over all others, and objects to alkaline substances, extract of malt and condensed milk, and saponin or quillaja. While separation cannot be entirely avoided on prolonged standing, when it happens the emulsion should be a perfect mixture after a slight shake. The general strength adopted is 50 per cent. of oil. As to correctives, glycyrrhizate of ammonia, about 1 oz. to a pint of oil, and saccharine in

the proportion of  $\frac{1}{2}$  grain to an ounce of oil, as recommended by Mr. Stout, he regards as excellent. Aromatic correctives are far more efficacious if mixed with some alcoholic liquor, such as brandy, rum or keish; the flavoring may be infusion of coffee, or some essential oil, using of the latter 15 drops to one pint of emulsion.—Chem. & Drugg., Sept. 14, 1895, 436; from Rep. de Pharm.

*Cod Liver Oil Emulsion—Preference to Irish Moss as Emulsifier.*—P. C. Arblaster has read an interesting paper on the various kinds of cod liver oil, their methods of preparation and emulsification. He prefers Irish moss (mucilage 1 : 5) as emulsifier, using 5 oz. of the mucilage to 8 oz. of the oil, 1 oz. alcohol, and water to make 16 ounces; flavoring to suit.—Pharm. Jour. Mar. 28, 1896, 254-255; from Proc. Midl. Chem. Assist. Assoc., March 18, 1896.

*Emulsion of Bromoform—Formula.*—The following formula is given in Amer. Drugg. (June 10, 1896, 326): Add 48 drops of bromoform to 20 Gm. of expressed oil of almond, emulsify this mixture in the usual manner with 2 Gm. of powdered tragacanth, 4 Gm. of powdered acacia, and sufficient water, using for the completed emulsion a total of 120 Cc. of water, and add, finally, 4 Gm. of cherry-laurel water.

#### EXTRACTA.

*Extracts—Definitions.*—The following definitions of the different kinds of extracts employed in medicine, by Dr. B. Hirsch, give so clear and concise a review of the character and pharmacopœial methods of the production of this important class of preparations, that the required space may properly be devoted to it in this report. In this review of the extracts, Dr. Hirsch observes, their preparations can only be considered in reference to the condition of the substance to be extracted, the character of the menstruum, under mention here and there of the temperatures, and the consistency of the final products. The various sorts of extracts are distinguished most completely by the Italian Pharm., namely:

- a. Prepared from the juice of fresh plants.
- b. Watery, prepared from dried plants with distilled water.
- c. Hydro-alcoholic, prepared with diluted alcohol.
- d. Alcoholic, prepared with strong alcohol.
- e. Ethereal, prepared with ether.
- f. Extracts, prepared by extracting the plants with water, evaporating the watery extraction, and extracting the residue of evaporation with alcohol—for example: ext. secal. cornut.

To these must be added:

- g. *Extracta rectificata* (Portugal), evaporated alcoholic extracts, which are re-extracted with strong alcohol—for example: ext. belladonnæ rectific.
- h. *Fluid extracts*, prepared with more or less strong alcohol, occasionally with addition of glycerin and chemicals, by percolation, and consti-

tuting liquid preparations of which 1 Gm. or 1 Cc. represents 1 Gm. of the plant substance.

*i. Extracta duplicia* (Swiss), prepared by extracting the drug by percolation with alcohol, occasionally with addition of tartaric or hydrochloric acid, and evaporating with sufficient powdered rice to make the final product weigh 1 part from 2 parts of the drug—these products corresponding to the

*k. Abstracta* (U. S., Russia), in which milk sugar is used in place of powdered rice.

Respecting their consistence the extracts are distinguished as follows:

*Extracta fluida s. liquida*—Fluid extracts, resembling a dense tincture.

*Extracta tenuia* (liquida, Danish), described as *thin*, like fresh honey or like purified honey in the Hungarian Pharm.

*Extracta mollia*, soft extracts (Belgian, French, and Italian Pharm), which do not moisten bibulous paper.

*Extracta spissa*, thick extracts, which cannot be poured out on cooling, but may be drawn into threads with the spatula; according to the Swiss Pharm., losing 18 to 20 per cent. of their weight when dried at 110°.

*Extracta subspissa*, half-thick extract, corresponding to soft extracts, but defined by the Hungarian Pharm. between *extracta tenuia* and *spissa*.

*Extracta firma s. dura*, solid or hard extracts, frequently so designated by the Belgian, French and Portuguese Pharm., of pilular consistence.

*Extracta sicca*, dry extracts, which may be rubbed to powder; according to the Swiss Pharm. losing not more than 4 per cent. of their weight when dried at 110°.

The *dry extracts* again are divisible into those that are dried without additions, and into such as are reduced to a dry condition by the aid of some indifferent substance. Such indifferent substances are:

*Dextrin*, used in formulas of the Roman and Hungarian Pharm.

*Milk sugar*, used in the American, Belgian, Grecian, Norwegian, Roman, and Netherland Pharm.

*Rice powder*, as already mentioned, used in the Swiss Pharm. for the preparation of *extracta duplicia*; and

*Licorice powder*, used in the Danish, Swedish, Finnish, German, and Japanese Pharm.—Pharm. Centralh., Nov. 21, 1895, 674-675.

*Compound Extract of Colocynth B. P.*—*Examination of Commercial Samples.*—John Barclay observes that a compound extract of colocynth prepared according to the B. P. formula and dried at 100° C., contains about 59.6 per cent. of extract of aloes, 19.8 of scammony (resin? Rep.), 14.9 of dry curd soap, 4.5 per cent. of cardamoms, together with so much of the colocynth used as is soluble in proof spirit. It might, therefore, be expected that a properly prepared extract would contain an amount of water, soluble matter equal to that of the extract of aloes and soap used (about 75 per cent.), plus a small percentage due to the colocynth and

cardamom. Similarly, the extract should yield about 20 per cent. to ether, that percentage representing the amount of scammony resin. The following table gives the results of an examination of eleven commercial samples.

	Moisture.	Calculated on Dry Extract			
		Ash.	Alkalinity as NaOH.	Soluble in Water.	Soluble in Ether.
1	7.05	4.22	1.10	47.4	14.51
2	11.59	6.33	1.81	69.6	18.86
3	12.10	5.79	1.08	56.1	15.84
4	7.18	6.50	1.88	60.7	13.55
5	9.51	4.05	1.69	79.0	29.56
6	19.85	5.37	1.58	77.0	15.90
7	15.29	6.30	2.41	58.6	13.72
8	8.14	5.03	2.28	82.4	16.20
9	2.73	6.62	1.45	62.0	9.55
10	4.24	6.80	2.70	55.8	22.39
11	3.50	3.30	0.37	40.6	6.57

The alkalinity of the ash was taken with the view to arrive at the percentage of soaps present. The dried curd soap used in preparing sample No. 10 was found to contain 6.92 per cent. of soda, so that the ash of this extract would contain just over 1 per cent. of soda due to the soap; but total alkalinity as soda of this sample was found to be 2.70; hence more than half the alkalinity of the ash in this case was due to the other ingredients. It will be noted that there is considerable variation among the samples in all points examined, and more particularly in the ether-soluble portion.—*Amer. Drugg*, March 25, 1896, 152; from *Proc. Midl. Chem. Assist's Assoc.*

*Acetic Extract of Ipecacuanha, B. P.—Modification of Process.*—F. C. J. Bird, after reviewing the causes that lead to the loss of alkaloid when acetic extract of ipecacuanha is made by the official (B. P.) process, concludes that the loss is mainly due to the prolonged heating necessary to evaporate the acetic acid extraction to dryness. He records the experiments used by him to overcome this difficulty, and finds the following process to give the most satisfactory results: 8 oz. of the drug, in No. 60 powder, are macerated with a mixture of 1 fl. drachm of glacial acetic acid and 8 fl. oz. of alcohol, and then percolated to exhaustion with alcohol. The percolate is concentrated by distillation and evaporated to dryness. The residual marc in the percolator is then macerated with a mixture of 4 oz. each of acetic acid and water, exhausted by percolation with water, and the percolate evaporated to dryness. The aqueous extract is then mixed with the alcoholic extract, and the whole powdered. The advantage consists in that the greater part of the alkaloid is taken up by the alcohol, and conse-

quently exposed to very little heat. From the experimental data given in the form of a table, it appears that whilst by the official process only 16.6 per cent. of extract containing 7.18 per cent. of alkaloid was obtained. 19.05 per cent. of extract, containing 7.8 per cent. of alkaloid was obtained by the improved process. The drug was found to contain 1.63 per cent. alkaloid, consequently there was a deficiency (or loss) in the official extract of 26.8 per cent., and in the improved extract of only 8.96 per cent. —Pharm. Jour., Aug. 24, 1895, 158-159; from. Proc. Brit. Pharm. Conf., 1895.

R. A. Cripps, in connection with his paper on "*Ipecacuanha*" (which see under "*Materia Medica*," ) makes some remarks in support of the view that if a weaker acid be used for the preparation of this extract, a more satisfactory product results. Following the B. P. process, he obtained from a half pound of ipecacuanha 900 grains of extract, assaying 8.24 per cent. alkaloids, while, with a menstruum of dilute acetic acid, 1-20, he obtained only 803 grains of extract, but it assayed 10.6 per cent. of alkaloids. By the B. P. process, therefore, only 73 grains of alkaloid had been extracted, against 85 grains by the second process, in which the weaker acid had been employed.

*Extract of Huckleberries—A Remedy in Eczema—Preparation.*—Winternitz highly recommends an extract of huckleberries for the treatment of eczema, which is prepared as follows: Dried huckleberries are covered with water and gently boiled over a slow fire until all coloring substance appears to be extracted, whilst the entire mass is still thin liquid. The liquid portion is then collected through a fine horsehair sieve, the residue upon the sieve being washed with hot water, and the liquid is then concentrated by boiling to a syrupy consistence a small quantity of salicylic acid (1 or 2 grams to a liter of extract) being added during the boiling. The extract is thickly applied to the affected parts by means of a brush, a thin layer of cotton wool is placed over it, and kept in place by means of a calico or gauze bandage. If a more adhesive extract is desirable, the salicylic acid may be replaced *ad libitum* by gum myrrh. The new preparation has received the name of

*Myrtillin.*—It constitutes a non-irritant, innocuous, firmly adherent covering for the affected cuticle when applied in connection with cotton wool or dusting powder, promotes the healing process, and is readily removed by carefully moistening and washing the coating with luke-warm water containing about 1 per cent. of table salt.—Pharm. Centralh., July 4, 1895, 389; from Medic. Post.

*Solid Extract from Fresh Vanilla—Proposed Preparation.*—In the paper of W. Krebs on vanilla (which see under "*Materia Medica*"), mention is made of a proposed concentrated extract representing all of the aromatic constituents of fresh vanilla, and that such should be prepared at the place of cultivation in connection with the process of curing

the vanilla. Gehe & Co., in their report of September, 1895, call attention to this preparation, and observe that such a preparation would be desirable from the stand-point of economy, since during the preparation and curing of the vanilla a quantity of its valuable constituents are lost, and there is a further loss in the subsequent treatment of the beans. The successful production of such an extract is still problematical, but it is held that even if successful, vanilla, in its natural condition, will always maintain its place in the market.—Pharm. Centralh., Sept. 12, 1895, 524.

*Extractum Ferri Pomatum—Improved Preparation.*—E. Adam recommends the following method for preparing extractum ferri pomatum: Ripe sour apples are sliced and extracted by percolation with water under a pressure of 4 atmospheres. The slicing of the apples is done in an apparatus such as is used for slicing beets in sugar works. The extracted liquor, which is perfectly clear, is saturated in a well-tinned kettle with freshly precipitated ferric carbonate, and, after filtration, evaporated in a vacuum apparatus. The extract so obtained is free from succinate, commonly produced by the splitting up of the malic acid during the process as ordinarily conducted. The process of percolation under pressure is applicable to the preparation of other extracts, such as ergot, gentian, liquorice, etc., and may be profitably supplemented by re-percolation.—Pharm. Centralh., Aug. 1, 1895, 441; from Rundschau.

*Malt Extract.—Simple Method of Determining Diastatic Value.*—M. Conny calls attention to the fact that in consequence of the demand for extract of malt for confectioner's use and other purposes outside of the usages of pharmacy, products are now being offered to pharmacists at very low prices. Several samples of this cheap extract of malt have come under his notice, and have been found absolutely void of diastatic power; but they are characterized by keeping much better than the extracts that have been prepared at low temperatures, and in which the diastase has in consequence not been destroyed by overheating. Inasmuch as medical men attach great importance to the diastatic value of malt extract, it is desirable to have a simple and reliable method of testing, which the author gives as follows: 'Take 10 grains of potato starch or arrow-root and boil it in 2 ozs. of water for three minutes, cool to 110° F., and add 10 grs. of the extract to be tested, dissolved in 1 oz. of water. Keep the solution at 100° F. until small samples (about 30 minims), taken out at intervals of a minute, cease to give a blue color with 1 drop of tincture of iodine. A good extract should not take longer than five or six minutes.—Pharm. Journ., May 2, 1896, 346.

*Meat Extracts—Composition and Examination.*—J. König and A. Romer have studied the composition of meat extracts. They contain, primarily, all the meat substances that are soluble in cold water: (1) nitrogenous compounds—kreatin, kreatinin, sarkin, xanthin, carnin, inosic.

acid, uric acid, urea; (2) Non-nitrogenous compounds—lactic acid, butyric acid, inosit, glycogen; (3) The greater part of the saline constituents—chlorides and phosphates of the alkalies. It has hitherto been an open question whether meat extracts contain in addition to the flesh-bases named, also gelatin or products of change of the nitrogenous substance of the muscle tissues. The studies and experiments of the authors have determined the following:

1. The acceptance heretofore that meat extracts contain gelatin is not substantiated; the amount of gelatin is, under all conditions, insignificant.

2. The meat extract contains appreciable quantities of albumoses.

3. Peptone is not present in meat extracts, or at all events, only in extremely small quantities.

4. Amido and acid-amido components also are either absent or present only in inappreciable amounts.

5. Ammoniacal-nitrogen, on the other hand, may always be looked for in appreciable quantities.

6. The principal nitrogenous constituent of meat extract, however, consists of the flesh-bases; beside these, and the ammoniacal-nitrogen, small quantities only of organic nitrogen compounds, non-precipitable by phospho-molybdic acid—possibly inosic acid, uric acid, etc.—are present.

Respecting the chemical examination of meat extracts, the authors observe that the precipitation with 80 per cent. alcohol, as required by the antiquated direction of Liebig, is no criterion of the character of the nitrogenous compound nor of the general composition of the product. For the recognition of its proper composition, the determination of the albumoses by *salting* with ammonia or zinc sulphate is indispensable. To accomplish this the aqueous solution of the extract is completely saturated with one or the other of these salts, and the resultant precipitate washed with a saturated solution of the same salt. The precipitate with ammonium sulphate is determined by weighing, and subtracting the amount of salt retained. That by zinc sulphate may be determined as nitrogen by Kjeldahl's method. The filtrate may, after decolorization with animal charcoal, be tested for peptone. It is desirable also to determine the ammonia in the meat extract by distillation with calcined magnesia. If the meat extract is free from peptone, the total nitrogen determined by the precipitate occasioned by phosphomolybdic acid may be calculated as derived from the flesh-bases, after deducting the nitrogen represented by the ascertained quantities of gelatin, albumoses, and ammonia; while the difference between the total nitrogen of the extract, and that ascertained as being present in the form of gelatin, albumoses, ammonia, and flesh-bases, gives the amount of the nitrogen-compound not precipitable by phosphomolybdic acid.—Pharm. Centralh., Dec. 5, 1895, 696; from Zeitschr. f. Analyt. Chem., 1895, 548.

*Nutrient Beef Foods—Preparation.*—At a meeting of the Chemists'

Assistants' Association (London, March 12, 1896), A. W. Gerrard read a report, "On Nutrient Beef Foods," in which some valuable information is given respecting this important class of preparations. A satisfactory

*Pepsin Meat Peptone* may be obtained as follows: One pound of good lean beef is finely minced, pulped through a No. 40 sieve, placed in a porcelain digester, and one pint of water at 60° C. slowly poured in with constant stirring. Two ounces of the fresh and active inner lining of a pig's stomach in fine shreds are mixed with the meat, the whole being constantly stirred for at least five minutes, so as to bring the pepsin and meat as completely into contact as possible. Three more pints of water at 60° C. are now slowly added with continuous stirring, and then one fluid ounce of dilute hydrochloric acid. The digester and contents are now heated and maintained at a temperature of about 50° C., and not exceeding 52° C., for two hours on a water-bath, after which the mixture is boiled, neutralized with sodium carbonate, filtered, and evaporated to a soft extract. The average percentage of dry peptone so produced is 18.1, and of anti-peptone 4.3 per cent. The production of

*Pancreatic Meat Peptone* may be accomplished at a somewhat higher temperature, the author's observation being that tryptic digestion can take place in three or four degrees higher than with pepsin without risk to the stability of the ferment. The most satisfactory process was found to be as follows: Twenty ounces of meat, pulped as mentioned in the foregoing formula, are mixed with 150 grains of pancreatin or 1 oz. of prepared fresh pancreas; 5 pints of water, at 60° C., and 100 grains of sodium carbonate are added, and the mixture is heated and maintained at 55° C., in a digester, for two hours, with constant stirring; it is then neutralized with hydrochloric acid, boiled, allowed to cool, filtered, and rapidly evaporated to the consistency of a soft extract, when it is ready for use. About 19 per cent. of dry peptone is yielded. Both varieties of peptone contain a fair amount of salt formed from the acid and soda used, and this acts as a preservative, so that the concentrated products will keep good for almost any length of time.

*Beef Essence* may be satisfactorily made by the following formula: One pound of lean beef—from the blade bone—is sliced, placed into an enameled pan with one pint of soft water, covered, brought to a boil, and allowed to remain for four hours, a little water being added from time to time. The product while hot is transferred to a clean flannel filter to drain, 60 grains of salt are added to the filtrate, and it is brought to the measure of 8 fluid ounces by the addition of water, or by evaporation. On cooling, a well-formed transparent jelly is formed, which is well-flavored, and contains approximately, 9.06 per cent. of solids.

*Albuminous Meat Juice* may be obtained by the direct expression of slices of lean beef, in which event it contains, besides traces of fat and blood corpuscles, about 7.3 per cent. of total solids, 3.9 being albumin



and 1.1 per cent. mineral matter. Another method consists in well stirring together one pound of finely pulped meat, 16 fluidounces of distilled water at 60° C., and 1 fluid drachm of strong hydrochloric acid for ten minutes, then adding 44 grains of sodium bicarbonate and express the mixture, after effervescence has ceased, through strong muslin, at first with the hands and finally mechanically. Either of these juices is quite equal in nutrient power to any in the market, whilst they are not unpleasant in flavor. Neither of them keeps without preservatives.

In conclusion the author says that a genuine liquid beef of pleasant flavor, containing the whole of the proteids, is wanted. The nearest approach to the ideal at present is peptone, but the bitter taste constitutes a serious drawback to its use.—Pharm. Journ., April 4, 1896, 276-277.

#### EXTRACTA FLUIDA.

*Fluid Extracts—Determination of the Amount of Extracts in Various Drugs with the view to Establishing Formulas.*—Dr. O. Linde communicates the results of the determination of the amount of extract from various drugs, made for the purpose of collecting data for establishing formulas for fluid extracts. The method was as follows: 10 Gm. of the well-dried drug in moderately fine powder, and 100 Cc. of the menstruum used for the preparation of the fluid extract, were macerated with frequent agitation for three days in a well-corked vial, the liquid filtered off through a dry filter, and 2 Cc. of the filtrate evaporated in a tared capsule in the water-bath, and dried to constant weight. The results are shown in the following table:

Drugs.	Menstruum composed of		Percentage of Extract in absolute dry drug.	Percentage of Extract in air-dry drug.
	Alcohol.	Water.		
Cortex Cascariæ Sagradæ .....	3	7	26.5	23.85
" " " .....	3	7	28	25.2
" " " deprived of bitter... ..	3	7	23	20.7
" Condurango .....	1	3	15.5	13.95
" Frangulæ .....	3	7	21.5	19.35
" " deprived of bitter .....	3	7	19.6	17.64
" Viburni prunifoliæ .....	2	1	26.6	23.94
Folia Hamamelidis .....	1	2	24	21.6
Fructus Belæ .....	1	4	32.5	29.25
Radix Colombo .....	1	1	16.5	14.85
Rhiz. Hydrastis .....	7	3	24	21.6
Secale Cornutum .....	1	4	17.1	15.39

The cascara and frangula barks were deprived of their bitterness by digesting 10 Gm. of the respective drugs with 1 Gm. calcined magnesia and 20 Gm. water for 24 hours, then drying completely, and pounding;

after which they were extracted as above stated.—Pharm. Centralh, July 4. 1895, 382.

*Liquid Extract of Coca—Preparation of a Miscible Extract.*—J. F. Brown observes that the liquid extract of coca prepared by the official directions of the B. P. is not miscible with water or wine so as to form a clear solution, on which account it is rejected by the public, and preference is given to a miscible preparation supplied by most wholesale druggists. The turbidity of mixtures of the official extract and water or wine is due to chlorophyll dissolved by the proof spirit directed as menstruum, and this can be avoided by the use of a weaker spirit, but if the latter is employed, there is liability to damage to the coca alkaloids by exposure to heat. He considers, however, that the latter objection is easily overcome by adopting a process of repercolation, and, unless it be demonstrated that loss of therapeutic efficiency is likely to ensue, he advocates that the liquid extract of coca be prepared with a menstruum composed of equal parts of proof spirit and water by repercolation.—Pharm. Journ., April 18, 1896, 306–307.

*Fluid Extract of Couch Grass—Improved Process.*—"Galen Jr." finds the official process for fluid extract of couch grass unsatisfactory. It is not alone difficult to exhaust the drug, but the amount of menstruum ordered by the U. S. Pharmacopœia is needlessly large, and taking up the time it does, there is liability of the aqueous liquid undergoing saccharine fermentation. He therefore suggests the following process, which yields an unexceptionable preparation: Place 1 pound of couch grass and 5 pints of water in a suitable vessel and boil for half an hour, stirring constantly; then remove from heat, strain and express. Boil the dregs once more with 5 pints of water, stir, strain, and express as before, unite the two solutions, evaporate to 12 ounces and add 4 ounces of alcohol.—Amer. Drugg., Oct. 10, 1895, 215.

*Alkaline Fluid Extract of Grindelia—Preparation and Uses in Rhus Poisoning.*—"Galen, Jr." states that his experience coincides with that of Duhring, who in his "Treatise on Diseases of the Skin" states that fluid extract of grindelia is almost a specific for rhus poisoning. He finds, however, that the strongly alcoholic fluid extract of the U. S. Pharmacopœia cannot be compared in efficiency for this purpose with the alkaline fluid extracts as sold by several manufacturers, and that numerous cases have come under his observation in which the U. S. Pharmacopœia preparation proved useless, whilst they yielded readily to the alkaline preparation, for which he proposes the following formula, taken from "Rother's Beginnings of Pharmacy:"

Moisten 16 oz. grindelia robusta with a menstruum of 3 parts of alcohol and 1 part of water, pack in percolator, cover with menstruum, macerate 48 hours, percolate to exhaustion, distil off the alcohol, and concentrate

the percolate to a soft extract. Dissolve 3 drachms of sodium bicarbonate in a minimum quantity of water, add the solution to the extract, mix thoroughly and warm when effervescence ceases; then add 4 ounces of the recovered alcohol and enough water to make 12 ounces (16 ounces ? Rep).—*Amer. Drugg.*, Oct. 10, 1895, 215-216.

*Fluid Extract of Cubeb—Examination of Commercial Specimens.*—Percy Hyers has determined the total solids, oil and fatty matter and resin contained in four samples of fluid extract of cubeb purchased in the market and in one sample of his own make, prepared in strict accordance with the official directions. His results are given as follows:

Sample.	Total Solids.	Color of Residue.	Oil and Fatty Matters.	Resin.
1	15.30	Brownish-green.	11.92	4.22
2	14.30	Green.	7.86	3.98
3	13.85	Dark brown.	7.60	4.66
4	11.97	Dark brown.	8.90	4.08
Own	20.85	Dark brown.	13.70	4.40

—*Amer. Jour. Pharm.*, Oct., 1895, 519.

*Liquid Extract Pareira, B. P.—Improved Process of Preparation.*—John Barclay observes that the present formula for the preparation of liquid extract of pareira, B. P. is unsatisfactory on account of the partial insolubility of the aqueous extract directed, and the consequent trouble and loss occasioned by the filtration necessary. Instead, therefore, of using 4 parts of the extract, as ordered, it is better to take an equivalent quantity of the root (20 parts), and from it prepare an extract by exhausting with a mixture of 3 parts of water and 1 part of methylated spirit, the resulting extract being then dissolved in the official menstruum—alcohol 1 part and water 3 parts. The product contains about 20 per cent. of total solid matters. Methylated spirit is recommended solely on the ground of economy, the author considering that the direct extraction of pareira with the official menstruum by a process of percolation and re-percolation would answer quite as well.—*Amer. Drugg.*, March 10, 1896, 152; from *Prac. Midl. Chem. Assist. Assoc.*

*Fluid Extract of Saw Palmetto—Suggestion of a Formula.*—Ferd. A. Sieker has endeavored to devise a formula for a fluid extract of palmetto berries (*Sabal serrulata*), but his endeavors were handicapped by the meagre information concerning constituents of this fruit, the literature upon the subject being probably confined to the paper of C. C. Sherrard communicated to this Association at the Asheville meeting (in *Proceedings* 1894, 309), in which a partial analysis of palmetto berries is given. Sherrard found besides 0.54 per cent. of volatile oil and 12.8 per cent. of

fixed oil, some resinous and extractive matter, etc., but a nearer examination of these constituents has not been made. The properties of the drug are stated to be sedative, diuretic, tonic, nutrient, and aphrodisiac, and the dose, as given on the label of commercial fluid extracts, from 1 to 4 Cc. of these preparations. Sieker has examined two samples of fluid extract, which he describes, and on the basis of his examination suggests the following formula as yielding a product similar to one of them: Moisten 1000 Gm. of saw palmetto, in No. 40 powder, with 300 Cc. of alcohol, and proceed to percolate with alcohol in the usual manner, reserving the first 850 Cc. of percolate, distilling the alcohol from the exhaust percolate, dissolving the extract in the reserved portion, and adjusting the volume of the fluid extract to 1000 Cc. with alcohol. The clear fluid extract so obtained has the yellowish brown color, odor and taste of the commercial type, a sp. gr. of 0.8807 at 25° C. and yielded 12.98 per cent. of oil and 13.6 per cent. of extract.—Pharm. Rundschau, Oct., 1895, 236.

*Fluid Extract of Wild Cherry—Improved (?) Process and Menstruum.*—Garet V. Dillenbach recommends a menstruum composed of glycerin one-third, water two-thirds, for preparing a fluid extract of wild cherry, which, he says, is applicable for making syrup of wild cherry that is fully equal to the syrup made by the U. S. P. process. He gives directions for carrying out the process; but it is evident that the proportions have been in some way transposed and confused, and the explanation given in the conclusion of the paper does not in any way throw light upon this. Possibly a fluid extract made with the menstruum mentioned may prove an efficient substitute for the official preparation; but the author should give a clear idea of the various steps in the process. It certainly cannot be his intention that 10½ troy ounces of the bark shall be *moistened* with 3½ pints of menstruum, and then *packed firmly* in a percolator of two gallons capacity.—See Proceedings New York State Pharm. Assoc., 1895, 114-115.

*Bitterless Cascara Sagrada—Formula and Process for its Preparation.*—Henry B. Gilpin communicates the following formula for a powder of cascara sagrada which, while containing all the resinous constituents of the drug, is free from bitterness, and may be used for making the various liquid preparations demanded. Mix together 500 Gm. powdered cascara sagrada, 110 Gm. powdered licorice root, 10 Gm. calcined magnesia and 5 Gm. powdered cloves, transfer to a "power kneader," moisten with sufficient water, and thoroughly knead the mixture into a mass. Transfer the mass to a closed drying chamber, and subject it during 48 hours to a uniform temperature of 180° F. Then permit the moisture to escape from the chamber, and thoroughly dry the powder, which is then re-powdered and sifted.—Amer. Jour. Pharm., March, 1896, 135.

## GLYCERITÆ.

*Glycerinum Amyli, B. P.*—*Unsatisfactory Characters.*—William Elborne states that the present B. P. formula containing water yields an unsatisfactory product, which will not keep without separating into lumps and a liquid portion; but when it is made without water, according to the B. P. 1867, a product is obtained which keeps well and answers all requirements. The author also offers an improved process for making

*Glycerinum Plumbi Subacetatis*, whereby the water in the solution of lead subacetate is not alone removed more expeditiously, but more effectually: Evaporate 1 pint of solution of lead subacetate in a porcelain dish until it becomes pasty; then transfer the dish with its contents to a water bath, and evaporate to dryness. Then add 1 pint of glycerin, and effect solution with aid of heat.—Chem. and Drugg., Jan. 18, 1896, 85.

*Glyceritum Hydrastis, U. S. P.*—*Loss of Alkaloids by the Process of Preparation.*—Ferd. A. Sieker, referring to the observation of F. A. Thompson (1893) that glycerite of hydrastis varies greatly in alkaloidal strength, records some experiments made in order to determine the quality of a preparation made according to the U. S. P., and at what stage of the process the loss of alkaloids occurs. A quantity of hydrastis was percolated with alcohol, and the alkaloids determined in a part of the percolate by Thompson's method (see Proceedings 1893, 691). The results showed that 2.12 per cent. of berberine and 1.97 per cent. (volumetrically) of hydrastine had been extracted. Then, finishing the preparation according to the official directions for glyceritum hydrastis, and assaying the product in the same way, he found it to contain only 1.6 per cent. of berberine and 1.38 per cent. (volumetrically) of hydrastine.—Pharm. Rundschau, October, 1895, 236.

## INFUSA ET DECOCTA.

*Decoctions and Infusions of the B. P.*—*Proposed Modifications of Strength, etc.*—W. Martindale discusses the subject of the decoctions and infusions in their relation to the revision of the British Pharmacopœia. In view of the fact that these preparations are of necessity prepared extemporaneously, he considers it important that the time required for their preparation should be shortened as much as is consistent with the proper extraction of the drug, and he thinks that this can be done, with few exceptions, so that decoctions shall be boiled during ten minutes, whilst an infusion of fifteen minutes is usually sufficient. He advocates, furthermore, that both decoctions and infusions shall be made, with few exceptions, of a strength of 1 in 20, thus conforming to the practice in some of the foreign pharmacopœias. In distinction from the practice in some of the latter, however, he considers it better to give an individual process for each decoction and infusion, so as to allow of the state of comminu-

tion of the drug being mentioned, and to facilitate their quick preparation. In the case of decoctions, about 20 per cent. more menstruum should be used to commence with than the required amount of finished product, even this excess necessitating the addition of menstruum through the dregs in order to make up the required measure. In most cases he gives preference to an uncovered vessel for the boiling, as the contents are less liable to froth over in uncovered than in covered vessels. Of the twenty-eight infusions now official in the B. P., that of columba alone should be made with cold water; all the others should be made with boiling water, a less heat being insufficient to prevent the tendency to fungoid development. They should be stirred occasionally while infusing, and the liquid simply strained off, without attempting to make the product up to a definite volume.—Pharm. Jour., Nov. 16, 1895, 415-416.

*Infusions, B. P.—Suggestions Pertinent to the Revision of Their Formulæ.*—R. A. Cripps, referring to Mr. Martindale's paper on "Decoctions and Infusions," attributes the variable character of infusions as dispensed to a want of precision in the directions for their preparation. He agrees, also with Mr. Martindale that, with few exceptions—ergot, buchu, rhatany—the time for their preparation can be advantageously shortened; but he does not agree that they should be made uniformly of the same relative strength of drug to finished product, the advantage being rather in retaining a uniformity in the doses, which in a number of infusions cited would have to be changed considerably if the plan of using the same quantity of drug to make a given quantity of infusion is adopted. The author also discusses the availability of

*Concentrated Infusions*, from which the official infusion might be prepared by dilution with water. He suggests several of them (which are indicated below,) but objects to the name "concentrated infusions," preferring to call them "essences," as suggested by Professor Attfield. The following drugs yield, by the method given, preparations of a satisfactory character, it being understood that in the preparation of the concentrated infusion eight times the B. P. quantities of solids are used to make 1 pint of concentrated infusion.

*Calumba.*—The best preparation was obtained by repercolation of the drug with a menstruum consisting of one part of rectified spirit and 4 parts of water. On dilution this preparation afforded an infusion resembling the first one.

*Quassia.*—This may be made both by maceration and percolation, but the following appears to be the most reasonable of the two: Macerate 2 ozs. of quassia in 16 ozs. of cold water for twenty-four hours, strain, boil the strained liquor (which should be 12½ ozs), wash the marc with 3½ ozs. of water and add 4 ozs. of rectified spirit.

*Senega.*—The best preparation was one made by repercolation with 20

per cent. alcohol. The preparation (which evidently forms a precipitate on standing—Rep.) should be well shaken before dispensing. It being nearly always prescribed with ammonia carbonate, this dissolves the deposit.

*Rose*.—Moisten 4 ozs. of the petals with 8 ozs. of a mixture of equal parts of rectified spirit and water, allow to stand two days, pack in a percolator, and percolate with water until 19 ozs. of fluid have been obtained. To this add 80 minims of sulphuric acid, and water to make 20 ozs. Set aside for a week, decant the clear liquid from the deposit, and filter the remainder.

*Gentian*.—By re-percolating the orange and gentian with cold water and a tincture of the lemon, boiling the percolate to sterilize, and adding rectified spirit to 22 per cent. This in dilution is very like the fresh article.—Chem. & Drug., Dec. 12, 1895, 857-858.

*Infusions—A Plea for their More Extended Use*.—Dr. W. Thornton Parker, referring to a recent paper by Dr. Purdon, of Belfast, Ireland, in which he speaks disparagingly of the use of infusions on various grounds, and extols the modern practice of prescribing the products of the chemist's laboratory, makes some timely remarks on the value of infusions as medicaments. Undoubtedly the modern herbalist may be able to accomplish considerable harm by ignorantly prescribing his remedies for the treatment of disease; but this is equally true of druggists and physicians, and we all know to what an alarming extent the public make use of quinine, paregoric, bromide, antipyretics, and coal-tar products in general, not to speak of the sarsaparillas and other patent medicines too numerous to mention. Dr. Parker believes that it would not be a retrograde movement to return to the well-known methods of extracting and administering vegetable drugs—by infusion, methods which were in successful operation in the times of our forefathers, and there is little doubt that we are the losers by neglecting as we do this old-time method of therapeutics. There are many plants and roots available to-day, the therapeutic employment of which would tend to relieve much of suffering and disease; and the author is inclined to believe that such would in many instances act more speedily and with better results, than by following the modern fashion of given concentration in form of tablets and pills, etc.—Drugg. Circ., Febr., 1896, 30.

#### LINIMENTA.

*Liniments of the B. P.—Criticisms*.—The "Pharmaceutical Journal" (Dec. 21, 1895, 514), in view of the revision of the British Pharmacopœia, revises and criticises the formulas of that standard for liniments, the majority of which seem to yield satisfactory products.

*Linimentum Ammonia* is a fruitful source of trouble, being when newly made thinner than it should be, but becoming too thick to flow readily

from the bottle by keeping. The following gives an unexceptionable product, with a slight increase in strength: Stronger solution of ammonia,  $1\frac{1}{2}$  fl. oz.; solution of lime,  $4\frac{1}{2}$  fl. ozs.; olive oil, 9 fl. ozs.; oleic acid,  $\frac{1}{2}$  fl. oz. The solution of ammonia is diluted with the lime water, mixed with the oil, shaken well, and the oleic acid is added.

*Lin. Potass. Iodid. c. Sapone* is more quickly prepared, using only 1 ounce of soap, as follows: Reduce the soap to fine shreds, and dissolve in 5 ounces of water in a porcelain dish over a water-bath. Dissolve the potassium iodide in the remaining 5 ounces of water, add the glycerin, pour this liquid into the soap solution, stirring briskly, and add the oil of lemon with constant stirring.

*Lin. Terebinth.* yields varying results, chiefly on account of the varying quality of the soap, some samples of soft soap being leathery rather than gelatinous in consistence. Using boiling water, and stirring well with a knife in a mortar previously warmed, adding the solution of camphor in the turpentine very gradually, and treating it like whipped cream, gives good results. A good suggestion is that of Giles, who uses only half the quantity of soap, dissolving it in the turpentine with the camphor; the water is then added gradually, with vigorous shaking, until a thin, milky emulsion is produced. The use of oleic acid and solution of potash, was suggested by Tichborne (1874) and by Jones (1888). The formula of the latter is pronounced very good by Squire, the quantities ordered corresponding to 1 ounce of a soft soap containing 20 per cent. of water.

*Liniment of Soft Soap—Preparation from the Oil Direct.*—C. E. Smith suggests the following method for preparing liniment of soft soap direct from the fixed oil, which has the advantage of convenience as well as of greater uniformity of strength. Dissolve 75 Gm. potassa in 200 Cc. of water, put the solution in a bottle of about 1500 Cc. capacity, add 325 Gm. linseed oil and 300 Cc. alcohol, and shake the mixture briskly for some time, until there is no further separation of oil on standing. Let the solution stand in a moderately warm place for twenty-four (to forty-eight) hours, then dissolve in it 20 Cc. oil of lavender, add enough water to make the product measure 1000 Cc., mix and filter. The process is easily finished in ten days, the main precaution to be observed being that the potassa be neither stronger nor weaker than 90 per cent., unless allowance be made for difference in strength. Refined cotton seed oil or olive oil may be used instead of linseed oil without changing the proportion of potassa, but these oils usually produce a liniment of lighter color than would be obtained from linseed oil.—*Amer. Jour. Pharm.*, April, 1896, 187-188.

*Menthol Liniment.—Formula.*—H. W. Preissler recommends the following formula for a "menthol liniment," which has been prescribed with advantage by physicians in his locality, for incorporation in the "National Formulary."—Menthol, chloral, camphor, of each 1 oz.; soap liniment, enough to make 16 oz.—*Proceedings Kentucky Pharm. Assoc.*, 1895, 54.



*Linimentum Styracis—Formula.*—Marker gives the following formula for a storax liniment: *Styrax liquidus depuratus*, 50 Gm.; *oleum ricini*, 37.5; alcohol of 95° to 96°, 12.5. The formula is said to yield a clear, limpid, and permanent product.—Pharm. Centralh., Dec. 26, 1895, 749; from Pharm. Ztg.

*Liniment—Approved Formula.*—C. E. Battles communicates the following "approved" formula for a liniment, which may be used internally or externally." Camphor, 1 oz.; ammonia water, 4 fl. dr.; oil of sassafras, 4 fl. dr.; oil of cloves, 1 fl. dr.; chloroform, 2 fl. dr.; oil of turpentine, 1 fl. dr.; alcohol, 3½ fl. ozs. Dissolve the ingredients in the alcohol in the order named, and filter.—Merck's Market Rep., Aug. 15, 1896, 331.

*Lead Water Liniment—Formula.*—C. Boeck recommends the following liniment as useful in the treatment of inflammatory and itching skin diseases: Talc, starch, each 100; glycerin, 40; lead water, a sufficient quantity (200) to make a liniment. In the case of very sensitive skin, one-half the lead water may be replaced by 1 per cent. borax water.—Pharm. Centralh., Aug. 15, 1895, 467; from Monatsh. f. prakt. Dermat.

*Chilblain Lotions and Liniment—Various Formulas.*—Dr. B. C. Boeck states that he had most excellent results in the treatment of frost-bite from the use of the following lotion: Ichthyol, resorcin, tannin, each 15 Gm.; distilled water, 75 Gm. The remedy is recommended particularly for "unbroken" chilblains, forming, when applied every night, a varnish-like coating over the skin. While it does not alone allay irritation, but also reduces the swelling of the parts affected, it has some objectionable features, and it is not admissible for "broken" chilblains, for which he proposes a salve (which see under "Cerates and Ointments.") Where the lotion cannot be used on account of appearances (discoloration and shriveling of the skin) it may be replaced by the following: Resorcin, 2 Gm.; talcum, 1 Gm.; mucilage of acacia and water, each 5 Gm. This is also useful for chapped lips, but must be applied for a long time to obtain good results. The author also recommends the following:

*Liniment for Unbroken Chilblains.*—Camphor, cantharides, alcanet, each 2 Gm.; table mustard, 4 Gm.; oil of cajuput, 1 Gm.; oil of rosemary, 3 Gm.; oil of turpentine, 80 Gm. Macerate ten days with frequent agitation, and then filter. Rub in night and morning.—Amer. Drugg., Oct. 25, 1895, 251.

*Lotions for Pruritus—Formula.*—Dr. A. Cooper Key suggests the following lotion for the treatment of pruritus ani: Pulv. sodae bibor., Gr. xx.; glycerin, ʒij.; naphtha rectificat., ʒss.; Aq. flor sambuci, ad ʒvi. Ft. Lotio. Or, in place of this, the following: Calamina levig., ʒiss.; acid. hydrocyanic (Scheele's), ʒss.; glycerin, ʒij.; liq. calcis, ad ʒviij. Ft. Lotio.

The bowels should be regulated with the late Sir Andrew Clark's pill,

taken once, twice or thrice a day (see formula under "Pills.")—Chem. & Drugg., April 18, 1896, 559; from Brit. Med. Journal.

*Cooling Lotion for Pruritus.*—The following formula is recommended by the "Practitioner": Liquor ammonii acetatis, ʒij; acidi hydrocyanici diluti, ʒj.; spiritus rectificati, ʒiij.; aquæ rosæ ad ʒviij. To be applied.—Ibid., p. 559.

*Neuralgia Lotion—Formula.*—The "Scalpel" recommends a lotion composed of 1 p. of crystallized menthol and 1 p. of alpha-guaiacol in 18 parts of absolute alcohol, to be applied to the painful parts in cases of neuralgia. About 1 drachm of the lotion is painted on the surface with a camel's-hair pencil, and is then covered with wadding at once. It may be repeated once or twice during 24 hours.—Nat. Drugg., Feb. 1891, 47.

#### LIQUORES.

*Solutions—Methods and Tables for Conveniently Establishing Percentages.*—The "Western Druggist" discusses the various methods that have been proposed for conveniently and rapidly ascertaining the amount of substance required to make from it solutions containing definite percentages. The principal advantage resulting from this review is that it calls attention to what appears to be frequently overlooked, that by a percentage solution of a dry substance—such as cocaine for instance—the percentage intended is that of the weight of the solid to the weight of the liquid used as solvent, and this holds true even for mixtures of liquids unless *volume* percentage is expressly designated. Thus a 1 per cent. solution of cocaine hydrochlorate is not a solution of 1 grain of the salt in 99 minims, but a solution of 1 grain in 99 grains of water, a difference which becomes more apparent when we remember that a fluidounce or 480 minims weighs about 455.5 grs. at the normal temperature, and still more so when the percentage is increased to 4, 8 or 10 per cent. A convenient method is that suggested by Hans M. Wilder, by which the careful calculation otherwise necessary to produce percentage solutions in fluid quantities is avoided, though at the expense of some of the material. To make a fluidounce of a four per cent. solution of cocaine hydrochlorate, for instance, 4 times 5 grains of the salt (= 20 grains) are dissolved in 480 grains of distilled water. The volume so produced is over a fluidounce, which being measured off, the remainder is rejected. But after all, the most economical way is also the most accurate, and a modification of the rule originally suggested by the late Professor J. F. Judge, will give the quantity of substance to be used to make a definite volume (approximately accurate) of the desired weight percentage (absolutely accurate): Multiply the weight of a fl. dram of the solvent by the number of fl. drams required, and this by the required percentage. Then divide by 100. The result will be the number of grains of substance required for the desired volume (the total weight being adjusted so as to be that of a fl. dram of

the solvent multiplied by the number of fl. drams required.—Rep.). The paper quoted also embraces two convenient tables, the one for making in fluidounces any quantity of percentage solution, the other for making in fluidounces solutions that are stated to contain 1 part in 1000, 100, 50, 25, 10, 5, etc., which are reproduced from an article by C. C. Sherrard, published in 1891, and need not be reproduced here.

*Lime Water—Examination of Samples from Different Stores.*—David L. Greenewalt has examined twenty-one samples of lime water from different stores with the view of ascertaining the quality ordinarily dispensed, with results given in the following table and showing that so far as their alkalinity was concerned, the majority contained more calcium hydrate than is required, whilst a few were very deficient.

50 Cc. of lime water should require 20 Cc. of decinormal oxalic acid volumetric solution.

50 Cc. of Sample.	Cc. of Volumetric Solution.	50 Cc. of Sample.	Cc. of Volumetric Solution.	50 Cc. of Sample.	Cc. of Volumetric Solution.
1	19.8	8	20.0	15	20.0
2	21.6	9	18.5	16	21.5
3	18.5	10	21.9	17	21.6
4	18.6	11	19.2	18	22.5
5	8.6	12	8.7	19	20.7
6	26.1	13	21.5	20	21.3
7	18.5	14	20.7	21	20.3

One sample contained alkalis; four samples were cloudy when purchased; four others did not clear with excess of carbon dioxide, and one sample contained chlorides and sulphates. The author also tested some

*Lime Water Tablets and Tablet Triturates* of the market to ascertain their reliability for the extemporaneous preparation of lime water, for which purpose they are recommended. None of the five samples, dissolved according to the accompanying directions, formed clear solutions, and they required whilst in their cloudy condition 1.2, 16.3, 10.2, 13.8, and 2.7 Cc. of volumetric oxalic acid solution to saturate 50 Cc. of the water; whilst, when filtered, the quantity of volumetric solution required was 0, 8.8, 8.7, 10.1 and 2.1 respectively in the same order.—Amer. Jour. Pharm., Nov., 1895, 562-564.

*Solution of Magnesium Citrate—Improved Formula.*—A. I. Widlum recommends the following formula as being preferable to the official formula for making solution of magnesium citrate: Place 336 grains of citric acid, previously powdered, and 60 grains of calcined magnesia in a Florence flask, add about two fluid ounces distilled water, facilitate the reaction by rotation, and filter into a 12 oz. bottle. Add 720 minims of

syrup of citric acid, sufficient water to nearly fill the bottle, and then 30 grains of potassium bicarbonate, when immediately cork and tie over with cord or wire.—Proc. North Dakota Pharm. Assoc., 1895, 40-42.

*Solution of Citro-Phosphate of Sodium—Preparation.*—William C. Wescott has made some experiments with the view to preparing a highly concentrated solution of sodium phosphate, several such having been placed upon the market within the last few years under proprietary titles. He finds that by following the formula and directions given below, a concentrated solution of sodium phosphate is readily obtained which corresponds in specific gravity, acidity (titrated as citric acid) and the amount of phosphoric anhydride, to one of these proprietary preparations (Melachol): Triturate 100 Gm. of crystallized sodium phosphate, 2 Gm. of sodium nitrate, and 13 Gm. of citric acid together until they liquefy, and add enough water to make 100 Cc.\*—Amer. Jour. Pharm., May, 1896, 256-257.

*Solution of Chloride of Iron—Examination of Commercial Samples.*—Three samples of solution of ferric chloride were examined by J. M. St. John, a student of the Chicago College of Pharmacy, and the result is reported by Prof. W. A. Puckner. The sp. gr. respectively was 1.382, 1.371 and 1.370, the official requirement being "about 1.387." Foreign metals were detected, in slight quantities, in one, this sample also containing an appreciable quantity of chloride of sodium. One of the other samples gave a reaction for nitric acid, and the third sample contained some ferrous salt. The percentage of iron indicated volumetrically was 11.93, 12.3 and 11.38 per cent. respectively.—West. Drugg., May, 1896, 200.

*Solution of Iron, Manganese, Arsenic and Nux Vomica—An Italian Method of Preparation.*—Francisco Zanardi gives the following formula for a solution of iron, manganese, arsenic and nux vomica, in which the alkaloids strychnine and brucine are claimed to be united with iron citrate to form true double salts. The first step is to prepare the *iron citrates*, for which purpose 13.488 Gm. of citric acid are dissolved in 300 Cc. of distilled water, and heated with about 5 Gm. alcoholized iron at 80° to 90°, under frequent stirring and addition of water, until a small sample shaken with ether from time to time, no longer yields any free citric acid to that solvent, its absence being determined by means of litmus paper. The solution is allowed to cool, decanted from excess of iron and the iron citrate, the greater part of which has crystallized out during the process, and 0.14 Gm. of strychnine are dissolved in 150 Cc. of it by the aid of gentle heat. A true double salt, *Ferro strychnine citrate*, is thus produced, while the corresponding *brucine* compound is obtained by adding to the remaining 150 Cc. of decanted liquid, 0.06 Gm. of brucine, and heating gently as before. The crystalline iron citrate (about 16.89 Gm.),

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\* See also *Sodium Phosphate* under "Inorganic Chemistry."

is now dissolved in 10 per cent. ammonia solution by the aid of gentle heat, about 11.75 Gm. being necessary for this purpose, and a deep green solution of *ferro-ammonium citrate* being produced upon addition of 200 Gm. of water. A solution of *manganese ammonium citrate* is then prepared by gently heating 0.7 Gm. of manganese carbonate with a solution of 1.21 Gm. of citric acid in 10 Gm. of distilled water, adding 2 Gm. of ammonia after reaction has ceased, heating to effect the solution of the crystalline manganese citrate that has deposited; and finally decanting the clear solution from the undissolved manganese carbonate. *Alkaline ammonium arsenic* solution is now made by shaking together 0.4 Gm. arsenous acid, 20 Gm. water, and 2 Gm. solution of ammonia under gentle heating. The several solutions so obtained are now mixed, evaporated on a steam bath to 100 Cc., and finally acidified with 0.5 Gm. of citric acid, the preparation keeping better when slightly acid. Upon filtration the resultant fluid is clear, green-red, miscible with water and alcoholic liquids, and has the following composition in 100 :

Ferro-ammonium citricum .....	18.00 Gm.
Mangano-ammonium citricum.....	1.40 Gm.
Acidum Arsenosum .....	0.40 Gm.
Strychine } combined with iron citrate.....	{ 0.14 Gm.
Brucine }	{ 0.06 Gm.

It is given by Prof. Albertoni to adults in dose of 2 to 20 drops, and he praises its efficiency.—Pharm. Centralh. Aug. 29, 1895, 493 ; from Bollett. Chimie. farm., 1895.

*Solution of Potassium Arsenite—Rapid Process of Preparation.*—Andrew Campbell proposes a method for the rapid preparation of solution of potassium arsenite, which is based upon the ready solubility of arsenous acid in solution of potassium hydrate, his experiments having been suggested by a recent paper of Garraud on the same subject in Bull. Soc. de Pharm. de Bordeaux. The author considers the doubling of the quantity of potassium bicarbonate in the Pharm. of 1890 as unnecessary, the single quantity directed in the Pharm. of 1880 being sufficient to produce monopotassium arsenite in permanent solution. On this basis he proposes that the official solution be made by agitating 10 grammes of arsenous acid, in powder prepared from the pure acid occurring in masses, with 100 Cc. of official solution of potassium hydrate, or, preferably, if convenient, with the same quantity of normal volumetric solution of potassium hydrate. The solution is effected rapidly in the cold, and may then be diluted to 970 Cc. with water, and 30 Cc. of compound tincture of lavender added. By experiment the author found that only 71.5 Cc. of either of these solutions is necessary to effect complete and permanent solution, but he prefers to use the larger quantity to allow for a possible deficiency in the strength of the liquor potassæ. The author incidentally examined the

commercial powdered arsenous acid, and found the best samples to be only of about 93 per cent. purity. He also examined eight specimens of Fowler's solution, obtained from retail druggists with one exception. He found them to be practically satisfactory with a single exception. this specimen containing 10 times as much arsenous acid as is required—a blunder that is difficult to explain.—*Am. Jour. Phar.*, Aug., 1895, 403-407.

*Note.*—The reporter questions the propriety of substituting the caustic potassium hydrate solution for potassium bicarbonate, even if the process is materially hastened by its use. Surely the arsenous acid will dissolve rapidly enough for all practical purposes, for its solution may be effected in a few minutes—operating in the quantities of the *Pharmacopœia*—if the acid and bicarbonate are boiled with a small quantity of water in a large test-tube.

*Liquid Peptonate of Iron—Various Formulas.*—The “*Moniteur de la Pharmacie*” gives a number of formulas for liquid peptonate of iron, as follows :

I. Dissolve 5 Gm. of peptone in 50 Gm. of glycerin and 50 Cc. of distilled water ; add a sufficient quantity of flavoring, and then 6 Gm. of solution of iron chloride, and 25 Cc. of distilled water. Filter through wetted cotton.

II. Dissolve 10 Gm. of dried egg albumen in 190 Gm. of distilled water, add 50 centigrams of pepsin, and digest the whole for 15 minutes at 40° C. Mix 90 Gm. of solution of dialyzed iron with 30 Gm. of syrup and 550 Gm. of water, and add the mixture to the first solution obtained. Heat to 90°-95° C. allow to cool, add 100 Gm. of brandy, and sufficient water to make the whole measure 1 liter. Allow to stand eight hours and decant the clear solution.

III. “*Jeillet's Peptonate of Iron.*” Dissolve 5 Gm. of dried peptone in 50 Gm. of distilled water, add to the solution 12 Gm. of the neutral solution of iron chloride of the French Codex, and redissolve the precipitate formed by adding a solution of 5 Gm. ammonium chloride in 50 Gm. of distilled water. When the solution is clear, add 75 Gm. of glycerin and sufficient distilled water to make it measure 200 Cc. It is then rendered alkaline by the addition of a few drops of ammonia water. Each Cc. contains 5 Mgm. of metallic iron.—*Amer. Drugg.*, Dec. 10, 1895, 345.

#### MISTURÆ.

*Mistura Ferri Composita—Manipulation.*—W. Johnson says: Dissolve the sugar with the iron sulphate instead of mixing it with the myrrh and potassium carbonates ; then, remembering the admonition of Prof. Redwood that “sugar is unfriendly to emulsions,” the myrrh (nice, oily pieces) should be rubbed hard with the potassium carbonate till it becomes not only pulverulent but pasty, before adding the rose-water. When that is done, the emulsion can (when diluted) be safely strained through coarse muslin, to remove bits of bark, etc.—*Pharm. Journ.*, March 7, 1896, 184.

*Mixtures for Children—Useful Prescriptions.*—The staff of the Evelina Hospital for sick children (Southwark, London,) has recently published a second edition of the Pharmacopœia of the Hospital, which contains a large number of good prescriptions for children. A few of these have been reproduced in "Chem. and Drugg." (April 25, 1896, 580), among which the following :

*Mistura Bismuthi Sedativa.*—Take of : carbonate of bismuth, 3 gr. ; carbonate of sodium, 3 gr. ; solution of hydrochlorate of morphine, 1½ m. ; dill water to 1 fl. dr. Mix. Dose for a six months old child, 1 fl. drachm.

*Mistura Carminativa.*—Take of : aromatic spirit of ammonia, 2 m. ; tincture of ginger, 1 m. ; compound tincture of cardamoms, 3 m. ; dill water to 1 fl. dr. Mix. Dose for a six months old child, 1 fl. drachm.

*Mistura Stomachica.*—Take of : carbonate of sodium, 2 gr. ; syrup of ginger, 2½ m. ; aromatic spirit of ammonia, 4 m. ; infusion of rhubarb, 30 m. ; compound infusion of gentian to 1 fl. dr. Mix. Dose for a six months old child, 1 fl. drachm.

*Linctus Infantilis.*—Take of : compound tincture of camphor, 2½ m. : ipecacuanha wine, 2½ m. ; glycerin, 20 m. ; peppermint water to 1 fl. dr. Mix. Dose for a six months old child, 1 fl. drachm.

*Cholera Drops—Approved Formula.*—C. E. Battles communicates the following "approved" formula for cholera drops : Tincture of capsicum, tincture of opium, of each 2 fl. ozs. ; tincture of camphor, 3 fl. ozs. ; tincture of catechu, tincture of rhubarb, spirit of peppermint, of each 4 fl. ozs. Mix. Does : Twenty drops. The author also gives the following formula for

*Sarsaparilla with Iodides.*—Fluid extract of sarsaparilla, fluid extract of stillingia, of each 3 fl. ozs. ; fluid extract of yellow dock, fluid extract of may-apple, of each 2 fl. ozs. ; iron iodide, 10 grs. ; potassium iodide, 1 dr. ; sugar, 1 oz. ; distilled water, 2 ozs. Mix, adding the iron and sugar, dissolved in the water, last ; shake well and filter.—Merck's Market Rep., Aug. 15, 1895, 331.

#### MUCILAGINES.

*Mucilage of Acacia—Preservation from Mould by the Addition of Acetanilid.*—Looking for some innocent preservative for mucilage of acacia, Arthur M. Kellar, in view of the antiseptic properties of acetanilid, prepared some with water containing 2 grains in the fluid ounce. The resulting mucilage, after eighteen months' observation, proves to keep well, and containing only about 1 grain of acetanilid in the ounce, this is probably unobjectionable. It, however, only prevents the formation of mold, the formation of acidity being little, if at all, retarded.—Chem. and Drugg., March 14, 1896, 378.

## OLEA.

*Phosphorated Oil—Objections to its Internal Use, etc.*—Mr. Martindale observes that this official (B. P.) preparation, which contains about 1 per cent. of phosphorus, is exceedingly nauseous, and that, notwithstanding certain expedients suggested to make it palatable in mixtures, etc., it is never employed medicinally. It may be conveniently administered in the form of pearls or capsules.

*Phosphorated Cod Liver Oil* containing about  $\frac{1}{16}$  th grain of phosphorus in the fluid drachm, may be made by adding 1 volume of the official phosphorated oil to 59 volumes of cod liver oil. It is also unpalatable, quickly oxidizes, but may be kept reasonably stable in capsules, containing one drachm in each.—Pharm. Journ., Mar. 14, 1896, 201.

## OLEATA.

*Oleate of Mercury—Reaction with Potassium Iodide.*—Wm. Lyon calls attention to the changes produced when oleate of mercury 1 part is prescribed with oint. of potassium iodide, 7 parts. The primary reaction is to form mercurous iodide, which in presence of the excess of potassium iodide is converted into mercuric iodide and free mercury. A bluish color is produced, quickly changing to dirty brown; but in a few days the color gradually disappears, with the disappearance of the free mercury, and the ointment assumes a yellowish white color.—Pharm. Journ., Jan. 18, 1896, 56.

## OLEORESINÆ.

*Oleo-Resin of Male Fern—Percentage of Filicic Acid and Method of Determination.*—Dacomo and Scoccianti, in the course of investigation upon male fern and its oleo-resin, have determined that it is quite possible to determine its principal active constituent, filicic acid, as follows: A weighed portion of the extract (oleo-resin) is dissolved in ether and shaken during half an hour with an aqueous solution of copper acetate. The ethereal solution is decanted, after subsidence, the residual crystalline magma aqueous suspension is collected on a weighed filter, washed successively with water, alcohol and ether, and the copper salt of filicic acid so obtained dried at 100°. The direct determination of filicic acid in the rhizome is accomplished by exhausting the powder by the aid of a Soxhlet apparatus with ether, until a portion of the ethereal percolate no longer becomes turbid on addition of solution of copper acetate, then treating the ethereal extract as above. The authors found the rhizome to contain from 1.7690 to 2.4217 percent. of amorphous filicic acid, while the oleo-resins examined contained percentages varying from 11.86 to 42.53 per cent. They regard these variations not to be due to the variable quality of the drug, but to the method of extraction and the quality of the ether used for this purpose, which should be free from alcohol.—Pharm. Centralh., April 2, 1896, 208; from Apoth. Ztg., 1896, 174.



*Oleo-Resin of Male Fern—Proposed Substitute.*—Van Aubel observes that the active constituents of the male fern, as represented by *Extractum filicis æthereum*, are, the amorphous filicic acid, an essential and a fixed oil, and filix-tannic acid. He calls attention to the toxicity of filicic acid, which is increased by the fixed oil, because the latter exerts solvent action upon it, and he proposes the substitution of the customary oleo-resin, by using the isolated amorphous filicic acid and the essential oil, to the exclusion of the fixed oil and of the filix-tannic acid, the latter having insignificant action as a taenifuge. The formula he proposes is as follows: Amorphous filicic acid, 0.4 Gm.; essential oil of male fern, 0.6 Gm.; oil cinnamon, 10 drops; gum arabic, 8.0 Gm.; water, 96.0 Gm.; syrup, 50.0 Gm. Castor oil must be omitted, and instead calomel, jalap, and scammony given preparatory to the taenifuge dose.—Pharm. Centralh., Feb. 6, 1896, 74; from Journ. de Pharm., 1895.

*Oleo-resin of Ginger—Percentages Obtainable from Different Commercial Varieties.*—See *Ginger*, under "Materia Medica."

#### PILULÆ.

*Pills—Animal Charcoal as Excipient.*—Senor Evich proposes animal charcoal as an excipient for making pills with such substances as creasote, croton oil, etc. Its value depends upon its power of absorbing these fluids, about twice their weight of the charcoal being necessary to produce a damp powder with either of these fluids, which may then be made into a mass with a little Venice turpentine and rolled into pills in the usual manner. Under circumstances, two and a half parts of animal charcoal may be necessary to about one part of the creasote or oil. The damp powder so obtained may then be mixed with other ingredients that are prescribed, such as tannin, iodoforn, etc., and made into a mass with Venice turpentine.—Pharm. Jour., Oct. 5, 1895, 288; from Revista Farmaceutica, Argentina.

*Pill Coating—New Composition.*—Cocks recommends a mixture of equal parts of tincture of tolu, mucilage of acacia, and simple syrup for varnishing pills.

*Gelatin Coating for Pills*, which shows the color of the pills very clearly, and at the same time is very soluble in the stomach, is obtained by the following formula: Gelatin, 74 Gm.; boric acid, 7.5 Gm.; mucilage of acacia, 60 Gm.; distilled water, sufficient to make 210 Gm.—Amer. Drugg., April 10, 1896, 215.

*Pilula Ferri, B. P.—Improved Formula to Decrease Size.*—Wm. Lyon, while conceding that the official formula for Bland's Pills is a good one, so far as missing and keeping properties are concerned, believes it an advantage to decrease its bulk, and has experimented with this in view. He finds that the bulk of the pills is one-fifth less than by the official method, when the formula is modified as follows: Dried carbonate of potassium,

30 grains ; dried sulphate of iron, 36 grains ; powdered sugar, 15 grains : powdered tragacanth, 3 grains ; glycerin, 2 minims ; syrup, 10 minims, or a sufficiency. The pill mass obtained will meet every test that can be applied to the B. P. mass.—Pharm. Jour., Jan. 18, 1896, 56.

*Blaud's Pills—Commercial Quality.*—R. C. Cowley, with the view to ascertain the quality of Blaud's pills, which are at the present time being retailed in England at extremely low rates, has determined the amount of ferrous carbonate in thirteen commercial specimens, several of which were being pushed among medical men as having peculiar advantages not possessed by the pills of other manufacturers. Several of the pills were fresh stock ; the others were of various ages, from six weeks up to two years old. Five of the specimens contained less than one grain of ferrous carbonate, which is the B. P. standard, while the others contained the compound in excess : the variation in the first case being between 0.698 and 0.905 grains, and in the latter between 1.047 and 1.946 grains of ferrous carbonate in each pill.—Pharm. Jour., Jan. 4, 1896, 15.

*Pil. Ferri et Aloes, B. P.—Reduction of Amount of Aloes.*—Wm. Elborne observes that it is a very common complaint that the official pills of iron and aloes contain too much aloes. Under the idea that the aloes is of secondary importance in these pills, he, therefore, recommends the following improved formula : Dried sulphate of iron, 3 grains ; socotrine aloes,  $\frac{1}{2}$  grain ; confection of rose, sufficient for pill.—Chem. and Drug., Jan. 18, 1896, 85.

*Pilula Phosphori—Improved Formula.*—W. Martindale, after reviewing and criticising the B. P. formula for phosphorus pills, together with numerous other formulas that have been suggested, recommends the preparation of these pills from a

*Solution of Phosphorus in Oil of Theobroma*, prepared as follows : 10 grs. of phosphorus are dissolved in 200 fluid grains of carbon bisulphide contained in an amber-colored stoppered vial, 490 grains of oil of theobroma are added, and dissolved by agitation aided by the heat of the hand ; then, if necessary, increase the volume to 750 fluid grains by the addition of more bisulphide of carbon. This solution will contain 1 part by weight of phosphorus in 75 fluid parts. It partially solidifies at about 59° F. but readily liquefies at a slightly higher temperature. To make

*Phosphorus Pills*, 54 fluid grains of this solution, previously liquefied by the warmth of the hand, are quickly mixed with 18 grains of gum acacia in fine powder, 18 grains, by weight, of syrup are added, and the mixture is triturated to form a uniform mass, which is rolled into 24 pills when most of the carbon bisulphide has evaporated. Each pill contains about  $\frac{1}{3}$  grain of phosphorus, but they may be increased or decreased in strength, using the ingredients in the same proportions, and remembering that the finished mass contains about 1 per cent. of phosphorus. After

exposure, so that still more carbon bisulphide may escape, the pills may be coated with an alcoholic solution of sandarach, or other covering. Another useful aid in making pills, is

*Phosphorus Mass (Sevum Phosphoratum 10 per cent.)*, which the author has recommended on another occasion for conveniently dispensing phosphorus with other medicaments. It is made by dissolving 1 part of phosphorus in 5 parts of carbon bisulphide, adding 9 parts of suet, mixing thoroughly, and allowing the bisulphide to evaporate. The phosphorus is here contained in a finely divided state. If mixed with an equal quantity of compound tragacanth powder, together with the medicament desired, and adding a few drops of chloroform to prevent oxidation and phosphorescence, it may be readily massed by means of mucilage of acacia, or syrup. The pills, as in the case of those previously mentioned, will keep well if covered with sandarach solution or pearl coating.—Pharm. Jour., March 14, 1896, 202-203.

*Pills of Sodium Iodide — Preparation.*—The "Journ. de Pharm. d'Anvers" (lii. 18) publishes the following method for making pills of sodium iodide: Anhydrous sodium iodide, 4 Gm.; powdered sugar 40 Cgm.; distilled water, 1 Gm.; powdered starch, 60 Cgm. Rub the iodide and sugar together, add the water, mix, add the starch, and mix well. Remove the mass from the mortar while soft and lay it on the pill machine, well dusted with starch powder. Roll quickly and dry in a warm capsule.—Pharm. Journ., June 6, 1896, 416.

*Compound Colocynth Pills B. P.—Aromatic Spirit of Ammonia as Excipient.*—William Lyon finds that compound colocynth pills when made with aromatic spirit of ammonia as massing agent, retain their shape perfectly, pitting being scarcely perceptible after one month's keeping. The only objection is that the pills cannot be combined with calomel in presence of the ammonia.

*Guaiacol Pills—Excipient.*—It is stated that guaiacol is readily made into pills by mixing it with licorice powder and massing with glycerin. A drachm of guaiacol and two drachms of licorice powder (powdered licorice root? Rep.), require about 5 drops of glycerin to make a good mass.

*Creasote Pills* are made in the same way.—Chem. & Drug., July 27, 1895, 124.

*Santal Oil Pills—Excipients.*—The following formula is said to form a good mass for making pills of santal oil: Colophonium, 4.0 Gm.; santal oil, 5.0 Gm.; calcined magnesia, 0.5 Gm. The oil is triturated with the magnesia, and the mixtures added to the resin, previously melted at a gentle heat.—Pharm. Centralh, July 11, 1895, 407; from Monit. de la Pharm., 1895, 1744.

*Creasote Capsules—Estimation of Creasote.*—A. Sapin remarks that creasote perles and capsules are usually bought ready for use by pharma-

cists, and that to diminish the causticity of the creasote it is usual to add to the creasote a certain proportion of oil. He finds that the articles supplied often contain only traces of oil, and, therefore, recommends the following method of assaying them: Fifty perles (or capsules) are placed in a conical flask, covered with distilled water, and allowed to macerate for some hours in the cold. The application of moderate heat then suffices to liquefy the contents of the flask; the oil holding the creasote in solution rises to the surface, and, on cooling, the lower layer gelatinizes and solidifies. The upper layer is removed by shaking with 25 Cc. of ether, the gelatin mass is remelted, cooled, and the surface layer again treated with ether. The ether solutions are distilled in a tared flask, the weight of the oil residue ascertained, and this is then shaken out with ethyl or methyl alcohol, which removes the creasote and leaves it on evaporation so that its absolute weight may be ascertained. The process is applicable in most cases, the oils used as diluents being usually cod-liver, almond or nut oils. but it is not applicable in case of castor oil.—Pharm. Jour., May 2, 1896, 343; from *Moniteur*, xlv, 1081.

*Liver Capsules*.—*Approved Formula*.—C. E. Battles communicates the following "approved" formula for liver capsules: Resin of scammony, powdered socotrine aloes, blue mass, of each 20 grs.; oil of anise enough to make a mass, which divide into twenty pills, and put into capsule size 3. The author also gives the following formula for

*Headache Capsules*: Powdered capsicum, 5 grs.; acetanilid, 40 grs.; tartaric acid, 5 grs.; sodium bicarbonate, 10 grs. Triturate well, and fill 8 capsules (size 2) with this dry powder.—Merck's Market Rep., Aug. 15, 1895, 331.

#### PULVERES.

*Medicated Granules (Granular Powder)*.—*A New Form of Exhibiting Medicines*.—Maurier describes "medicated granules" as a novel form of exhibiting medicines. The granules are obtained by saturating specially broken sugar with medicated solutions, and allowing the solvent to evaporate. As far as is possible, the liquid used to make the solution should have as its base, alcohol, ether, or chloroform, so as not to dissolve the sugar. A typical example of such granular medicaments is

*Granulated Kola (Kola granulée)*, which at present is very much in vogue on the European continent: Dissolve 7.5 Gm. of hydro-alcoholic extract of kola in half its weight of alcohol at 60° by means of a water-bath; pour the solution on 150 Gm. of granulated sugar placed in a marble mortar, mix well by means of a stirring rod, place on a thin sheet of paper, and dry between 20° and 30° C., taking care to separate from time to time the adhering masses of granules. Each teaspoonful of these granules weighs 4 Gm. and contains 0.20 Gm. of extract. The granules are made as uniform in size as possible by means of sieves, any fine powder

being carefully sifted off.—Pharm. Jour., Febr. 8, 1896, 103; from Rep. de Pharm.

*Pulvis Acidi Borici Compositus*—*Formula*.—The following formula for a dusting powder for children is given in the Pharmacopœia of the Evelina Hospital for Sick Children (Southwark, London): Mix equal parts of powdered boric acid, powdered starch, and powdered oxide of zinc.—Chem. and Drugg., April 25, 1896, 580.

*Aperient Powder*—*Formula*.—The "Revue. Therap. Medico-Chirurg." gives the following formula for an aperient powder: Powdered rhubarb, 4 p.; dried sodium sulphate, 3 p.; sodium bicarbonate, 1 p.; essence of peppermint (or other flavor), a sufficient quantity. A teaspoonful of this is taken in the evening in a glass of plain or sweetened water.—Amer. Drugg., Oct. 10, 1895, 217.

*Dover's Powder*—*Historical Facts Respecting the Originator*.—Wm. B. Thompson communicates some interesting facts respecting Dover's powder and its originator, Dr. Thomas Dover, who was born in England in the year 1660, settled and practiced medicine for a time in Bristol, and in 1708 joined the company of a group of Bristol merchants in a scheme to fit out two vessels for privateering, or piracy, in the South Seas, going out on one of the vessels as captain. He returned again to Bristol after a period—the expedition having returned to Britain enriched with spoil, the treasure amounting to £170,000. He gained much professional reputation on the occasion of a severe epidemic of fever, and this may have suggested to him the use of ipecac and opium as a compound: a composition which could not have been more simple, yet has stood the test of time beyond anything which appears in the annals of pharmacy and medicine.—Amer. Jour. Pharm., June, 1896, 339-340.

*Pulvis Glycyrrhizæ Compositus*—*Cause of Inferiority in a Sample*.—George Coull had occasion to make an examination of a sample of compound licorice powder, which was characterized by a very light color, and a notable deficiency in sweet taste. His experiments led him to the conclusion that the powdered licorice root used in the abnormal sample had been extracted with water—either wholly or in part—with the view to removing the dark coloring matter and to produce a light-colored compound licorice powder.—Chem. and Drugg., Nov. 30, 1895, 798.

*Cachets and Cachet Machines*—*Description*.—The "Pharm. Journal" (Jan. 11, 1896, 23-26,) gives a chapter on cachets and the machines for making them, which, while bringing forward nothing that has not already been noticed in these reports, is mentioned here so that reference may be had by those who are specially interested in this method of exhibiting medicinal agents.

#### SAPONES.

*Soap*—*Systematic Course of Examination*.—The following method for

examination of hard (soda) and soft (potash) soap has been adopted in the "Codex alimentarius Helveticus":

1. *Determination of Water*.—5 to 10 Gm. of the sample is kept for 2 to 4 hours at a temperature of  $40^{\circ}$ , and then heated for 6 hours at  $100^{\circ}$  to  $103^{\circ}$ .

2. *Fatty Acids*.—5 to 8 Gm. of the soap are dissolved in 30 to 40 Cc. of warm water, the solution is decomposed by an excess of normal sulphuric acid, and shaken with 100 Cc. ether; a portion of the ether solution is evaporated in a weighing flask and weighed after heating in a water-drying oven for two hours. 96.75 per cent. of the ascertained weight is taken as the correct amount of the anhydride of the fatty acid.

3. *Combined Alkali*.—The fatty acids obtained under 2 are dissolved in 20 Cc. alcohol and titrated with  $\frac{1}{2}$  N. alcoholic solution of alkali, using phenolphthalein as indicator.

4. *Total Alkali*.—This is determined in the watery solution obtained under 2 by titrating back with  $\frac{1}{2}$  normal alkali, the result being calculated as  $\text{Na}_2\text{O}$  in the case of hard soap, and as  $\text{K}_2\text{O}$  in the case of soft soap.

5. *Alkali Carbonate*.—If a preliminary test has excluded free alkali—by means of phenolphthalein—the amount of alkali carbonates is found by subtracting the combined alkalies (3) from the total alkali (4), and calculating the result as sodium or potassium carbonate, according to the kind of soap examined.

6. *Free Alkali*.—Its presence having been ascertained preliminarily, 5 Gm. of the soap are dissolved in 100 Cc., alcohol, and the solution, contained in a tared and stoppered glass cylinder is placed in a water bath at  $50^{\circ}$  to  $60^{\circ}$  until it has become clear. A weighed portion is then titrated.

7. *Determination of Resin*.—This is done by von Hübl and Stadler's method, as follows: About 1 Gm. of the mixture of resin and fatty acids is dissolved by the aid of heat in 20 Cc. alcohol, and the solution is accurately neutralized with sodium hydrate. The cold liquid is then precipitated in a beaker, after dilution with 200 Cc. of water, with silver nitrate, the precipitate is collected in a filter, washed, dried at  $100^{\circ}$ , and extracted in a Soxhlet apparatus with ether. The ethereal solution is shaken with diluted hydrochloric acid, separated from this, evaporated in a tared flask, dried at  $100^{\circ}$ , and weighed.

Good soda soap should only contain traces of free alkali, and at most 0.5 per cent. of alkali carbonate. Medicinal and toilet soap should contain no free alkali whatever.—Pharm. Centralh., April 9, 1896, 226; from Chem. Ztg., 1896, 1876.

*Soap—Determination of Free Fats*.—Waltke & Co. suggest the following method for determining free fat in soaps: 10 Gm. of the absolutely anhydrous soap are reduced to a fine powder, and shaken a few minutes in a graduated 200 Cc. flask with 100 Cc. of absolutely anhydrous gaso-

line, the volume being finally brought to 200 Cc., and the mixture allowed to subside. 50 Cc. of the clear liquid are then filtered off through a double filter, carefully avoiding that any of the precipitate is poured on the filter, and the solution is then evaporated in platinum, and finally dried to constant weight at 100°. The ascertained weight is calculated for the soap in its original—non-dried—condition. It is of paramount importance that the soap and gasoline are absolutely anhydrous during the experiment.—Pharm. Centralh., April 16, 1896, 241; from "Seifen-fabricant."

*Ammonia Benzine Soap—Preparation.*—The "Chemist and Druggist" (May 23, 1896, 749) observes that ammonia benzine soap is a special preparation used by dyers and cleansers for washing delicate fabrics, and is much esteemed. It is made in England, but a similar preparation is obtained according to the experiments of two German chemists, as follows: Melt 100 parts of stearic acid at 30° to 50° C., and add to it 40 parts of 15.6 per cent. caustic potash solution, stirring well; then add to the half solid mass at the above temperature 8 to 10 parts of strong ammonia solution (B. P.), mix well, stir in 40 parts of melted tallow. Finally, add benzine to convert the whole into a nice, smooth paste.

*Castor Oil Soap—Experimental Preparation.*—J. F. Brown prepared castor oil soap by boiling one ounce of the oil with 60 grains of soda dissolved in one ounce of distilled water for 10 minutes, then stirring with a solution of 2 drachms of salt in another ounce of water, and the mixture allowed to cool. A firm white soap was obtained, weighing  $3\frac{1}{8}$  oz., and only a little moisture remained in the dish. Experiments made to dissolve the soap and to reprecipitate it were ineffectual, the soap being held in solution by the dilute brine. The first experiment was repeated, using the same quantities of soda and oil, but increasing the quantity of salt to 4 drachms in 2 ozs. of water. The solid cake of soap here weighed  $3\frac{1}{8}$  ozs. and the residual liquid in the dish  $\frac{3}{4}$  oz. When air-dry the weight of the soap was reduced to 3 oz., and, when sliced and dried again,  $2\frac{3}{4}$  oz. It was somewhat brittle, and evidently is not fit for medicinal use unless some method for removing the salt is devised.—Pharm. Jour., March 14, 1896, 207.

*Nicotiana Soap—Preparation and Medicinal Use.*—Mentzel, in view of the recognized value of infusions of tobacco and soap for scabies in sheep, has prepared a tobacco soap which is marketed under the name of "nicotiana soap." An extract of refuse tobacco and stems, containing from 7 to 9 per cent. of nicotine, is added to the soap mass in such proportions that the finished product contains about 10 per cent. of the extract. It is faintly perfumed with bergamot and of a black-brown color. T. Taenzer has used this soap with signal success in the treatment of itch, as well as in skin diseases produced by vegetable parasites, but finds its use unsuited for moist eczemas. The author lays particular stress upon the

promptness with which itching is allayed by its application.—Pharm. Centralh., Dec. 26, 1895, 745; from Monatsh. f. prakt Dermat., 1895, 631.

## SPIRITUS.

*Spiritus Ætheris Compositus, B. P.*—*Modification of Process of Preparation.*—W. Inglis Clark observes that the B. P. process for making the compound spirit of ether, which requires initially the preparation of heavy oil of wine and its subsequent solution in a mixture of ether and alcohol, is not as specific as that of the U. S. P., which requires the solution of a definite quantity of heavy oil of wine—for which specific directions are given—in definite quantities of ether and alcohol. Moreover, the direction to neutralize the very acid distillate containing the heavy oil of wine with lime water is faulty, since no provision is made to separate the acid aqueous portion before shaking the ethereal layer with the lime water; the latter, also, is not sufficiently alkaline to accomplish the desired purpose, while the direction to expose the ethereal distillate to the air for about twelve hours results in the loss of some of the heavy oil of wine. He records a number of experiments made with the view to pointing out a more satisfactory process for the forthcoming revision of the B. P., and concludes that the following formula, which yields a rather stronger preparation than that now official, might be suitable: Mix 80 fl. ozs. alcohol with 72 fl. ozs. sulphuric acid. After a day, distil slowly with thermometer in the liquid till the temperature rises to 340° F. Then separate the liquids, rejecting the lower or aqueous distillate, mix the ethereal liquid with 3 ozs. water and sufficient sodium bicarbonate to render neutral or nearly so. Decant the liquid, add 10 fl. ozs. ether and 80 fl. ozs. alcohol, mix and filter.—Pharm. Journ., March 7, 1896, 183.

*Spirit of Nitrous Ether—Rapid Method of Volumetric Assay.*—David Walker dispenses with the use of the nitrometer in the assay of spirit of nitrous ether by a method of assay which is dependent on the measurement of the iodine liberated from the potassium iodide through the decomposition of the nitrous ether by the U. S. P. process of assay. He has satisfied himself that his process gives fairly accurate results, but finds it expedient to replace the sulphuric acid, used in the official process, by acetic acid. The assay is made as follows: 5 Cc. of spirit of nitrous ether are measured into a 4 oz. Erlenmeyer flask, 10 Cc. of 6 per cent. acetic acid and 10 Cc. of test solution of potassium iodide are added, and the mixture is shaken occasionally for 10 or 15 minutes. A few drops of test solution of starch are then added, and the mixture is titrated with  $\frac{N}{10}$  volumetric solution of sodium hyposulphite until the bluish green color is discharged. If the spirit is of official strength, 22.5 Cc. of  $\frac{N}{10}$  V. S. sodium hyposulphite solution should be required; this corresponding to 0.2855 Gm. of iodine, the equivalent of 0.169 Gm. of ethyl nitrite, which is the amount properly contained in 5 Cc. of the official spirit of nitrous



ether, and which yields by the official method of assay 55 Cc. of gaseous nitric oxide. The author, in this connection, gives the results of the examination of ten commercial samples of spirit of nitrous ether, which show a great variation in strength, and bespeak the necessity of a popular method for the assay of the commercial spirit.—*Amer. Drugg.*, Dec. 25, 1895, 371.

*Spir. Etheris Nitrosi—Assay.*—Peter Mac Ewan, referring to David Walker's proposal to estimate the value of spirit of nitrous ether by direct titration of a mixture of the spirit, acetic acid and potassium iodide contained in an Erlenmyer flask with sodium thiosulphate solution, observes that this method was suggested by D. B. Dott a dozen years ago, but had to be abandoned on account of fallacious results. It was a knowledge of this that led A. H. Allen to effect the reaction in an air-free space and estimate the nitric oxide instead of the iodine, a method which has caused the latter to be deservedly forgotten. In this connection, Mr. Mac Ewan describes a

*Simple Burette Nitrometer* which was communicated by him to the "Chemist's and Druggist's Diary" for 1896. A burette is inverted, and a small funnel attached to it by means of a short piece of india rubber tubing; another funnel is attached by the tube. The volume of the ungraduated part of the burette should be determined and noted, and, of course, included in the reading.—*Amer. Drugg.*, Jan. 25, 1896, 58-59.

In reply to Mr. MacEwan's observations, Mr. Walker gives the results of a large number of determinations made by both methods in the same samples. These show the limit of variations by his method to be very little greater than by the nitrometric method. The same sample of spirit of nitrous ether assayed by the titration method from 3.35 to 3.677 per cent. of nitrous ether, and by the nitrometer method from 3.63 to 3.77 per cent.; but the variations seem greater by the nitrometer method when operating upon low-grade spirit of nitrous ether. Mr. Walker, in this connection, calls attention to a nitrometer, extemporized, in which the burette is used in its natural position. It was constructed by him a year ago for class demonstration, and is believed by the author to have some advantages over the nitrometer of Mr. MacEwan's description. After filling the burette with salt solution a rubber stopper bearing a short glass tube connected with a small funnel by a short rubber tube, is inserted so as to make a perfect joint. This forces the solution into the neck of the funnel and by means of a pinch cock a tight joint is secured. Then by opening the stop-cock of the burette, the point of which is connected with a rubber tube a little longer than the burette the other end being connected with a 4-ounce tubulated receiver—an easy control of the height of liquid in the equilibrium tube is provided. The burette is graduated so near to the top that the rubber stopper leaves only a small space

to be determined. It is true, that by inverting the burette the space between the graduation and stop-cock can be more accurately determined and remains constant; but if the spirit is anywhere near the U. S. P. strength, the equilibrium tests of Mr. MacEwan's apparatus will be uncontrollable.—*Amer. Drugg.*, Feb. 10, 1896, 79.

*Spirit of Nitrous Ether—Preparation from Commercial Concentrated Spirit.*—Mr. Underhill, in reply to a query, gives it as his opinion and experience that spirit of nitrous ether made from any of the commercial concentrated ethers is a very poor preparation, and recommends that if it is to be purchased, it should be the finished spirit from a reliable manufacturer.—*Proc. New Hampshire Phar. Assoc.*, 1895, 19.

*Spirit of Phosphorus—Instability, etc.*—W. Martindale observes that the spirit of phosphorus, U. S. P., which contains 0.12 per cent. of phosphorus, is an unstable preparation. An unstable also, though an active preparation, is

*Aether Phosphoratus*, formerly of the Codex, which is best prepared by comminuting 1 part of phosphorus in 4 parts of absolute alcohol, decanting the alcohol, adding 20 parts of absolute ether to the residual phosphorus, and macerating for a month, after which it may be dispensed by decantation from the excess of phosphorus. It contains about 1 part in 200 volumes. A preparation which keeps without depositing, though it also requires to be freshly prepared, is the

*Compound Tincture of Phosphorus*, B. P. C. This is prepared by dissolving 1 part of phosphorus in 30 volumes of chloroform, and adding enough absolute alcohol so as to contain 1 part of phosphorus in 600 volumes. When diluted with four volumes of glycerin, it forms

*Elixir Phosphorus*, B. P. C., which contains about  $\frac{1}{80}$  grain of phosphorus in a fluid drachm, constituting when freshly prepared a palatable preparation, which is well borne by the stomach.

*Liquor Phosphori Albumatus*, suggested by Urnick, is said to be a palatable preparation. It is prepared with albumen, cane and milk sugar, and glycerin, the albumen forming soluble compounds with phosphorus, which preserve it from oxidation as well as from phosphorescence.—*Phar. Jour.*, March 14, 1896, 101.

*Spiritus Saponatus Kalinus Hebræ — Extemporaneous Preparation from Oil without Heat.*—G. Gerstle recommends the following convenient method for preparing Hebra's soap solution, the formula being based upon that given in Hager's "Handbuch": Mix together 100 Gm. linseed oil, 100 Gm. alcohol (91 per cent.), and 40 Gm. solution of potassium hydrate containing 5 per cent. KOH; and shake vigorously for a short time, when complete solution will be effected; then add 230 Gm. spirit of lavender, 130 Gm. alcohol, and 95 Gm. distilled water. After standing a short time the solution is filtered.—*Pharm. Centralh.*, April 16, 1896, 232.

## SUPPOSITORIA.

*Glycerin Suppositories—New Formula.*—E. Lomuller, after pointing out the objections to the use of gelatin for glycerin suppositories, proposes the solidification of the glycerin by means of agar-agar, as follows: Agar-agar, in small pieces, 10 Gm.; distilled water, 200 Gm. Make a smooth soft paste by the aid of heat, stirring constantly, and then add glycerin, 200 Gm. Mix thoroughly, add any medicament required, and mould. The suppositories are transparent, less elastic than those made with gelatin, and more easily detached from the moulds.—Pharm. Journ., Aug. 31, 1895, 182; from *Il Giornale di Farm.*

*Glycerin Suppositories—Agar-Agar as a Base.*—Frank G. Ryan, referring to E. Lomuller's suggestion to use agar-agar in the preparation of glycerin suppositories, records some observations which prove the formula of Lomuller to yield a suppository deficient in firmness, while containing only 50 per cent. glycerin. While the author does not think that agar-agar can replace sodium stearate in the preparation of glycerin suppository, a tolerably satisfactory preparation, firm enough for insertion, is obtained by using 5 Gm. agar-agar, 45 Cc. distilled water, and 150 Gm. glycerin. This produces a 75 per cent. suppository, which has the advantage over those made with sodium stearate, that they leave the moulds easily, and are not affected to the same extent by exposure to air.—Amer. Jour. Pharm., Dec., 1895, 599-601.

*Suppositories for Hemorrhoids—Efficient Prescription.*—The following prescription for suppositories for hæmorrhoids is said to be excellent: Extract of ergot, 2 grains; extract of opium, extract of nux vomica, cocaine hydrochlorate, of each  $\frac{1}{4}$  grain; cacao butter, sufficient to make a suppository.—Chem. and Drug., Jan. 4, 1896, 15.

*Medicated Gelatin Bougies—Preparation.*—J. Schroeder prepares gelatin bougies as follows: Gelatin, 5 Gm., is macerated in water, 25 Gm., for a quarter of an hour; glycerin, 5 Gm., is then added, the mixture is heated until solution is complete, the liquid strained, and again heated until it is reduced to 25 Gm. If a soluble medicament is to be added, it is dissolved in a portion of the water, the solution added to the melted mass, and the whole heated until again reduced to 25 Gm.; but if more than 5 per cent. of the medicament is to be added, further evaporation of the mass should be avoided. Readily decomposable compounds should be dissolved in a known quantity of water, and that quantity evaporated from the mass before additions take place. When insoluble compounds are to be added, the gelatin mass should be prepared with water only, and the medicament added after mixing it with the glycerin.—Pharm. Jour., Dec. 28, 1895, 537; from *Nederlandsch. Tijdschr. v. Pharm. etc.*, 1895, 358.

*Gelatin Bougies of Alum—Preparation.*—The following formula for gelatin bougies containing alum is given in "*Nederl. Tijdschrift*:"—Macerate

5 parts of gelatin in 35 parts of water for fifteen minutes, then add 10 parts of glycerin, warm until the gelatin is dissolved and the liquid has evaporated to 40 parts. To the hot mass add a warm solution of 8 parts of alum in 25 parts of water. This addition causes the gelatin to coagulate, but on continued heating, it again liquefies. Evaporate to 64 parts, strain, and run it into moulds. In a similar manner

*Gelatin Bougies of Tannin* may be prepared. To the gelatin basis obtained as above a solution of 1 part of tannin in 5 parts of glycerin is added; the coagulated mass in this instance also becomes liquid again on heating, and after proper evaporation may be run into moulds. In both cases transparent bougies are obtained.—Pharm. Journ., June 20, 1896, 484; from Jour. de Pharm. d'Anvers, III., 19.

## SYRUPI.

*Syrups—Reviews of the Preparations, etc. of the Different Pharmacopœias.*—Joseph Ince communicates a paper on the "British and Foreign Syrups" in which he briefly reviews the suggestions that have been made from time to time respecting their preparation, preservation, improvement in formulas, etc., with special reference to the syrups of the B. P., and to the forthcoming revision of that standard. The paper cannot be profitably condensed, and reference must therefore be had to the original in Pharm. Jour., Feb. 15 and 22, 1896, 128-130 and 142-145.

In a line with this contribution also is a series of criticisms and suggestions respecting the syrups of the B. P. by the editor of "Pharm. Journal," which runs through several numbers, beginning with March 14, 1896, 203. Speaking of

*Syrups*, attention is called to the importance of using pure sugar, that should be practically free from glucose, that known as "granulated pure cane sugar" being the best. It is quite exceptional, however, to meet with a commercial sugar that answers the B. P. description of "forming a clear, bright syrup," and clarification must be resorted to to insure a brilliant product, the best expedient being paper pulp, a little washed French chalk, and a flannel bag or strainer, returning the first portions that pass until the syrup runs off clear.

*Syrupus Aurantii* might be made with advantage by a process similar to that of the U. S. P., but an elegant and finer-flavored preparation is obtained by mixing thoroughly 2 fl. drs. concentrated infusion (or "essence") of orange peel (? Rep.), 1 fl. dr. soluble essence of bitter orange (? Rep.), and 7 fl. ozs., 5 fl. drs. simple syrup.

*Syrupus Aurantii Floris*, while it does not appear to call for any alteration, nevertheless a stronger flavored syrup is desirable, and it is suggested to be made by dissolving 3 parts of sugar in 2 parts of aq. flor.aurant. tripl., without heat.

*Syrupus Chloral* is also unobjectionable except in point of taste, which is nauseous. Its palatability might be increased and the peculiar acrid taste of the chloral hydrate better disguised, either by the substitution of syrup of orange flower for simple syrup, or the addition of a suitable flavoring agent. The ever-returning subject of

*Syrupus Ferri Iodidi* is considered at some length, and various defects in the B. P. process are pointed out. The following amended process is suggested: Place  $\frac{1}{2}$  oz. of iron (wrought nails) in a porcelain dish with 3 fl. ozs. of water, add 2 ozs. iodine in three or four successive portions, allowing combination to take place and the liquid to cool between the additions. When a drop of the liquid is seen to be free from yellow tint, heat the contents of the dish to gentle ebullition for five minutes, filter the hot liquid, washing the dish and filter with distilled water to make the filtrate measure  $3\frac{1}{2}$  fl. ozs. To this add 40 m. hypophosphorous acid, mix thoroughly, and add to a syrup, prepared from 26 ozs. sugar by the aid of a little heat in 10 fl. ozs. of water, filtering while warm, and washing filter with distilled water to  $27\frac{1}{2}$  fl. ozs. After thorough admixture, adjust the product to a weight of 2 lbs. 10 ozs. by the addition of distilled water, if necessary. The sp. gr. should be about 1.335.

*Syrupus Ferri Phosphatis* cannot be said to be up to date, and is suggested to be made by the formula proposed by R. Wright in 1888 (see Proceedings 1889, 409), which is briefly as follows: Mix 6 fl. drs. concentrated phosphoric acid with 9 fl. drs. distilled water in a glass flask, add 45 grs. iron, heat gently until solution is effected, filter into 8 fl. ozs. syrup, and wash filter with sufficient distilled water to make the product measure 12 fl. ozs.

*Syrupus Limonis*, made strictly by the official instructions, has an excellent taste, but is liable to change and crystallize. A better formula is the following: Heat 1 pint lemon juice to the boiling point, and having filtered it quite bright by the aid of a little washed kaolin, allow to cool, and dissolve  $2\frac{1}{4}$  lbs. sugar in the filtrate without heat. Add 7 fl. drs. tincture of lemon peel, and, if necessary, make the sp. gr. 1.315–1.320 by the addition of distilled water.

*Syrupus Papaveris*.—The essentials are strict observance of the official instructions, and care in storage. Squire suggests dissolving the sugar in the concentrated infusion without driving off the spirit, with the view to give it greater stability. A method similar to that employed in syrup of senna makes a good preparation, viz., evaporate the infusion to the final volume, add the spirit to precipitate the albuminoid extractive, filter, and in the filtrate dissolve the sugar without heat, straining finally through flannel.

*Syrupus Rhei* is a most objectionable preparation, being nauseous, unsightly, and liable to ferment or crystallize. It is preferably made from the liquid extract, as suggested by Squire, or, perhaps, by the following

process direct from the drug: Mix 15 parts of glycerin with three times its volume of water, and in this mixture macerate 15 parts of rhubarb root, in coarse powder; then percolate, and continue to percolate with water until 45 fluid parts have been collected. Dissolve 70 parts of sugar in the percolate, without heat and preferably by repercolation, and make the product measure 100 fluid parts. The syrup keeps well, and, if desirable, its flavor may be improved by adding an ounce of coriander. The formula for

*Syrupus Rosæ Gallicæ*, if retained, will doubtless be constructed on the lines of the U. S. P., but a bright, clear syrup is easily obtained from the petals direct, as follows: Macerate 10 parts of rose petals in a mixture of 1 part of glycerin and 10 fluid parts (each) of spirit (and water,) then percolate (with water, Rep.) until  $33\frac{1}{2}$  fluid parts are obtained. In this percolate dissolve the sugar without heat, and make the product measure 100 parts. A very fragrant

*Syrupus Tolutanus* is that prescribed by the U. S. P., and far preferable to the product of the B. P. formula, which requires modification. The product of the B. P. formula for

*Syrupus Zingiberis*, also, is anything but illustrative of elegant pharmacy, and the following formula is suggested: Add 1 fl. oz. strong tincture of ginger to a mixture of 90 grains finely-powdered pumice and 1 fl. oz. distilled water, shake well, and allow to stand one hour; then filter bright, and wash the contents of the filter with water to 9 fl. oz. In this dissolve  $17\frac{1}{2}$  ozs. sugar in a close vessel at a gentle heat.

The remarks on other B. P. syrups are not of sufficient importance to require mention here. A number of syrups are mentioned, also, for introduction in the forthcoming revised Pharmacopœia, but no formulas are given.—Phar. Jour, March 14 and 21, and April 11, 1896, pp. 203-204, 224-225, and 284-285.

*Medicated Syrups—Extemporaneous Preparation.*—Forsey Cornet recommends the preparation of a saccharate of the medicinal agent for the extemporaneous preparation of medicated syrups. The plant extracts are evaporated to  $\frac{1}{2}$  or  $\frac{1}{3}$  their volume, mixed with an equal part or one-half part of alcohol, filtered, and evaporated to dryness with sugar, so as to form a granulated mass. When syrup is to be made, this is dissolved in the necessary quantity of water.—Pharm. Centralh., April 23, 1896, 261; from Pharm. Post., 1896, No. 2.

*Iodotannic Syrups—Improved Preparation.*—Iodotannic syrups, which have long been used in France, are practically unknown elsewhere, but deserve more extended use, the iodotannic compound being an excellent therapeutic agent, since it gives the peculiar action of free iodine without its irritating properties. They were originally introduced by Guiliermord, who directed a syrup to be made by dissolving 2 Gm. of iodine in a suffic-

iciency of alcohol, and 8 Gm. of extract of rhatany in water, mixing the two solutions, filtering after a few hours, making the filtrate to weigh 360 Gm. and dissolving 640 Gm. of sugar in it. The Paris Society of Pharmacy has improved upon this by dissolving 1 Gm. of iodine in 14 Gm. of alcohol, adding 985 Gm. of syrup of rhatany.. Prof. Gay now communicates a paper in which he records his attempt to place the preparation of the syrup on rational ground. He points out that a definite compound of tannin and iodine is doubtless formed. If these two bodies are brought together alone, or in presence of alcohol, the combination does not come about; but if they are moistened with water, a strong and tear-exciting odor is developed, and the mixture forms a red colored solution. The reaction is hastened by heating. The assertion made by a French writer a few years ago, that the combination of iodine is not with the tannin, but with the invert sugar produced in the syrup by the transformation of tannin into gallic acid by free iodine, is not corroborated by Prof. Gay's experiments, and he suggests the following improved formula for the preparation of an iodotannic syrup: Dissolve 12 grains of iodine in  $\frac{1}{2}$  ounce of alcohol by trituration; add 12 grains of tannin, and then 1 pint of syrup; heat the mixture to boiling—until it ceases to color starch mixture—then filter. A pale yellow syrup, having a styptic taste, is produced. A similar and much more agreeable preparation is

*Iodogallic Syrup*, prepared exactly in the same way, but with gallic acid instead of tannin.—Chem. and Drugg., April 18, 1896, 556.

*Syrup of Ferrous Iodide—Examination of Commercial Samples, etc.*—Charles F. Carter has prepared syrup of ferrous iodide by the U. S. P. process, and subjected it, together with ten samples obtained in different cities, to the tests of that standard. He finds both the process and the official tests of quality to be reliable. As to the commercial samples, he has found six of them to contain the proper percentage (10 per cent.) of  $\text{FeI}_2$ , but two of these contained free iodine. The other four contained respectively 5.1, 6.8, 7.5, 8.6 per cent. of  $\text{FeI}_2$ , the first two being brown and green-brown and containing free iodine.—Am. Jour. Phar., July, 1895, 362-364.

*Syrupus Ferro-Calci Phosphorici—Formula.*—Dr. Siboni proposes the following formula for a syrup of iron and calcium phosphate: 2.29 Gm. of powdered iron (containing at least 98 per cent. Fe) are dissolved in a liter flask containing 42 Gm. of phosphoric acid, sp. gr. 1.350, mixed with an equal quantity of water, the reaction being accelerated by the heat of a water bath to about  $70^\circ$ . When the evolution of hydrogen ceases, a mixture of 13.60 Gm. of neutral calcium phosphate and 200 Gm. of water is added, and when this is dissolved, 250 Gm. of sugar, 5 Gm. of oil of lemon, and 50 Gm. of glycerin are added, and the volume of the syrup produced is adjusted to 1000 Cc. by the addition of water. In the color-

less syrup so produced the phosphoric acid is in excess to the amount of 10 Gm., whereby its stability is secured even in partly-filled vials.—Pharm. Centralh., Oct. 17, 1895, 596 ; from Bollet. Chemico-pharm., 1895, 481.

*Syrup. Hypophos. Co. B. P. C.*—*Cause of Sulphuretted Odor Sometimes Observed.*—In a paper read at last year's meeting of the Br. Phar. Conference, F. C. J. Bird made the statement that the sulphuretted odor sometimes emitted by Syrup. Hypophos. Co. B. P. C., resulted from the reduction of sulphates by the free hypophosphorous acid in the preparation. W. A. H. Naylor, to whom this statement was a startling one, has since made comprehensive experiments, the results of which he gives in a paper read at this year's meeting of the Conference. These experiments show conclusively that sulphates are not reducible by hypophosphorous acid under conditions that would be likely to exist in the making and storing of this syrup. On the other hand, the author's experience points distinctly to the presence of sulphites as the incriminating substance. Thus, when to an alkaline sulphite in aqueous solution is added an excess of hypophosphorous acid, sulphurous acid, and then sulphuretted hydrogen are formed, and can be recognized by their smell. An examination of commercial samples of hypophosphites (which see under "Inorganic Chemistry,") showed that every sample examined contained either traces or fair quantities of sulphates, whilst sulphites were absent in the most of them. Phosphites, also, were present in nearly every sample.—Pharm. Journ., Aug. 17, 1895, 143-144.

*Compound Syrup of White Pine—Modified Formula.*—Robert S. Sherwin, after trying hydro-alcoholic menstrua for the extraction of the ingredients for compound syrup of white pine with unsatisfactory results, obtained a satisfactory preparation by using a menstruum composed of two parts of water and one part of glycerin, and suggests the following formula for its preparation :

White pine bark, wild cherry bark, of each, 65.0 Gm. ; balm of gilead buds, spikenard root, of each, 8.7 Gm. ; sanguinaria root, 6.5 Gm. ; sassafras bark, 4.4 Gm. ; morphine sulphate, 0.4 Gm. ; chloroform, 4.0 Cc. ; glycerin, 150.0 Cc. ; sugar, 700.0 Gm. ; water, a sufficient quantity to make 1,000 Cc. Mix the glycerin with 300 Cc. of water. Having mixed the vegetable drugs, reduce them to a No. 40 powder, moisten this powder with sufficient of the menstruum, and allow to macerate for twenty-four hours. Percolate in the usual way, first with the remainder of the menstruum and then with water until 500 Cc. of percolate are obtained, in which dissolve the sugar and other ingredients without heat, strain, and make the product measure 1,000 Cc. by the addition of water.—Amer. Jour. Phar., May, 1896, 225 to 233.

*Cough Balsam—Approved Formula.*—C. E. Battles communicates the following "approved" formula for a cough balsam : Wild cherry bark, 16



ozs.; spikenard, 4 ozs.; ipecac, 3 ozs.; blood root, 1 oz.; laudanum, 4 fl. ozs.; granulated sugar, 6 lbs.; mixture of alcohol, 1 part, and water, 2 parts, sufficient; glycerin, enough to make a gallon. Grind the drugs to a coarse powder; moisten with a portion of the mixture of alcohol and water; macerate for 12 hours, then percolate to 5 pints; add the laudanum, and filter. Dissolve the sugar in the filtrate for percolation, and add glycerin to make a gallon.—Merck's Market Rep., Aug. 15, 1895, 331.

*Lemon and Orange Syrups—Preparation*—The following formulas are given in "Zeitschr. f. Kohlensäure Industrie": An essence of lemon, resp. orange, is prepared by cutting the thin fresh peels into small strips, placing them into a glass vessel, and pouring on enough rum, cognac, or a mixture of 5 p. alcohol and 4 p. of water to cover them to the height of a finger's width. The essence is filtered after 5 days' maceration. To make

*Lemon Syrup*, add 15 p. essence of lemon and 15 p. citric acid to 470 parts of simple syrup.

*Orange Syrup* is made by adding 10 p. essence of orange and 15 p. citric acid to 475 p. simple syrup. Though turbid at first, these syrups become clear after standing a few days. They may be colored with a trace of caramel.—Pharm. Centralh., Oct. 10, 1896, 588.

*Soda Water Syrups—Use of Licorice as a Foam Producer*.—Charles H. Bowersox, after having tried all the substances that are usually added to soda water syrups for the purpose of producing foam—such as solutions of gum arabic, solution of Irish moss, white of egg, gelatin, tincture of soap bark, slippery elm, etc.—and finding them all more or less unsatisfactory, was induced to try licorice, and has found it to be admirable for this purpose. The addition of six or eight fluid drachms of a good fluid extract of licorice to each gallon of finished syrup is sufficient for the purpose, and does not color the syrup so highly as one would imagine. He regards licorice as superior to anything he has tried, but if the slight color produced by the fluid extract is an objection, for instance in lemon or pineapple syrup, the next best is solution of gum arabic.—Pharm. Era, April 23, 1896, 511.

*Soda Water Syrups—Various Formulas*.—The Amer. Druggist and Phar. Rec. (July 25, 1889, 37) gives formulas for a number of soda water syrups which are stated to have all stood the test of time and can be depended upon. It is impracticable to condense these formulas, and reference must therefore be had to the original article for most of them, the titles of the syrups being the following: *Egg Cream, Nectar, Orgeat, Grape, Cream, Crab Apple Tonic, Cherry Cream, Orange* (several), *Blood Orange, Lemon* (several), and *Sarsaparilla*. Of these the following may find place here:

*Egg Cream Syrup*.—Rub 4 fluid ounces of cream with the yolks of 4

eggs, then add 12 fluid ounces of rock candy syrup and 1 fluid drachm of extract of vanilla. Serve with soda, as other syrups, and before handing over sprinkle a little fine mixed spice on top.

*Nectar Syrup.*—8 drops of essence of bitter almond ; 6 fluid drams of fresh orange flower water ; 10 fluid ounces of pineapple syrup ; 22 fluid ounces of raspberry syrup.

*Orgeat Syrup.*—45 drops of essence of bitter almond ; 4 fluid drachms of essence of orange peel ; 5 pints of simple syrup.

*Grape Syrup.*—2 fluid drachms of essence of lemon ; 8 fluid ounces of brandy ; 2 fluid ounces tincture of sandal wood ; enough simple syrup to make 1 gallon.

*Crab Apple Tonic.*—Evaporate 1 gallon of sweet cider to  $\frac{1}{2}$  gall. ; dissolve in this 7 pounds of granulated sugar ; add 4 ounces of extract of malt and 6 drachms of citric acid.

*Cherry Cream.*—8 fluid ounces of fresh juice of wild cherries ; 1 fluid ounce of fluid extract of wild cherry ; 1 drachm of citric acid ; enough simple syrup to make 4 pints. Serve  $1\frac{1}{2}$  ounces of this syrup with 1 oz. of cream syrup and 8 ounces of carbonated water.

*Blood Orange Syrup.*—2 fluid ounces of tincture of orange (made from the peel of 2 oranges, 1 fluid ounce of oil of sweet orange, and sufficient alcohol to make 1 pt.) ; 2 fluid ounces of solution of citric acid (50 per cent.) ; 8 fluid ounces of raspberry juice ; enough simple syrup to make one gallon.

#### TABELLÆ.

*Compressed Tablets—Practical Suggestions Concerning their Preparation.*—F. R. Leder makes some practical suggestions concerning the preparation of compressed tablets, with the special purpose of encouraging pharmacists to make their own tablets. Some drugs, he observes, compress readily without any special treatment, while others, being unadhesive, must be specially treated before they can be successfully compounded. Fine powders do not work satisfactorily, as they do not feed evenly, and do not compress regularly, yet it is important that every part of the material shall be in fine powder. To overcome this difficulty, the fine powder is granulated by adding the proper adhesive and moisture, then granulating and drying. Among the articles used as adhesives, sugar, starch and acacia are most prominent, but glucose and dextrin are sometimes used. The preference should be given to sugar whenever it is practicable, particularly over acacia, but sometimes both are used with advantage together. The acacia has the tendency to make the tablets less soluble. As moistening agent to make the granular powder, water is most generally used, sometimes 70 per cent. alcohol. The granulated powder, which is best obtained by passing the mass through a No. 20 tinned-wire sieve, must be thoroughly dried to prevent it from sticking during compression. To pre-

vent annoyance from this source, it is customary to add some lubricant, such as talcum, powdered boric acid, or, best of all, some white petrolatum: the latter being dissolved in ether, sprayed over the granulated powder, and this is then allowed to dry again before compression. The compression should be no firmer than is absolutely necessary, and success is further assured by keeping the molds and dies absolutely clean and polished. Among the substances that compress readily without any preparation are bromide of potash, iodide of potash, muriate of ammonia, chlorate of potash, and bisulphate of quinine; but as the latter sticks to the dies, it must have some lubricant added—three per cent. of powdered talcum, which amount need not be exceeded in any case, though sometimes it is advantageous to add this after having applied the petrolatum solution. Such substances as phenacetin, salol, antipyrin, antikamnia, trional, sulfonal, bismuth subnitrate and subgallate, quinine salicylate and sulphate, may be made by granulating their fine powders with 10 per cent. of sugar, and using petrolatum as lubricant. Benzoate of soda, benzoate of lithia, salicylate of soda, etc., are best granulated with 6 per cent. of powdered acacia. Other substances, such as charcoal, require both sugar and acacia, 15 per cent. and 8 per cent. respectively, though ordinarily when the two are used together 10 per cent. and 5 per cent. respectively are sufficient. Tablets containing active alkaloids are best made from granulations with sugar of milk and about 10 per cent. cane sugar. For solid extracts the powdered preparations are preferred, but if the ordinary solid extract is to be used, this is first reduced to powder with starch, then granulated with sugar of milk and cane sugar. Tinctures, with sugar of milk and cane sugar, usually furnish the moisture necessary for granulations. Effervescent tablets are best made by mixing granulations of the acid and alkali, then compressing the mixture. Tablets containing resins are best made from granulations in which 70 per cent. or 80 per cent. alcohol is used as moistener. *Tablets of calomel and soda*, by granulating the calomel with 10 per cent. of sugar, and the soda with 5 per cent. of sugar and 8 per cent. of acacia, mixing the two granulations, powdering, and granulating the mixture with (strong, ? Rep.) alcohol. *Soda Mint Tablets* are made by granulating 400 gr. sodium bicarbonate, 60 grs. powdered acacia, 25 grs. carbonate of ammonia, and 16 grs. oil of peppermint, by the aid of water, and using petrolatum as lubricant.—West. Drug., March, 1896, 103-105.

#### TINCTURAE.

*Tincture Marcs—Recovery of Alcohol.*—F. C. J. Bird, after discussing various methods that have been proposed for the recovery of alcohol from tincture marcs, calls attention to an apparatus which he describes as follows: The lower part of the apparatus forms a water bath; it is of large area and very shallow, and is furnished with a side-tube for a ther-

meter. The condensing cover is a circular water tank, having the bottom dished up in the form of a cone, the edge of which terminates above a V-shaped trough around the inner edge of the water bath. This trough is cooled by a cold water jacket underneath, and is inclined so that all the liquid runs out by the exit tube leading from it. The water pipes are so arranged that the current of cold water passes first round the water jacket of the collecting trough and then into the condensing cover, which rests on a flange in the water bath. This joint is secured by luting. The dimensions are as follows: Diameter, 18 in.; depth of water bath, 2 in.; height of cone in centre, 3 in. The marc having been spread evenly over the bottom of the water bath, the condensing cover luted on, and a small stream of water turned into the apparatus, the application of heat is quickly followed by the condensation of spirit, the distillation being effected at a remarkably low temperature.—Pharm. Jour., Aug. 24, 1895, 157-158; from Proc. Brit. Pharm. Comp., 1895.

*Tinctures of the B. P.—Variation in strength of Commercial Samples.—*

E. H. Farr and R. Wright, in continuation of their work heretofore published upon the subject of alkaloidal drugs, the best menstruum adapted to their exhaustion, methods of estimation, average alkaloidal strength of tinctures, feasibility to set up definite alkaloidal standards, etc., have now communicated a paper in which they give the results of their examination of twelve commercial samples of each of the following B. P. tinctures: Aconite, belladonna, cinchona, colchicum, conium, gelsemium, hyoscyamus, jaborandi, lobelia, nux vomica, opium, stramonium and veratrum. These results are given in three tables showing: 1. The amount of alkaloids in grammes from 100 Cc. of the tinctures; 2. the amount of extractive obtained by evaporating 100 Cc. at 212° F. to constant weight; and 3, the sp. gr. of the tinctures. They disclose the fact that the relative proportions of alkaloid and extractive contained in different samples of the same drug vary between very wide limits, and that there is a very wide range in alkaloidal value, some of the tinctures being of twice or three times the strength of others, among them even such tinctures as opium, cinchona and nux vomica, which are directed to be made from standardized drugs.—Pharm. Jour., Aug. 31, 1895, 180-181; from Proc. Brit. Pharm. Conf. 1895.

*Tincture of Cinchona—Advantage of Glycerin in the Menstruum.—*

Frederick Davis contributed a paper to the British Pharm. Conference in which he records some experiments made to determine the advantage, if any, of the addition of glycerin to the alcoholic menstruum employed for making tincture of cinchona. The paper, unfortunately, leaves one in doubt as to the strength of the spirit employed. Presuming that the author employed on the one hand a spirit containing 70 per cent. by volume of alcohol, and on the other a spirit of the same strength to which

10 per cent. by volume of glycerin had been added, the comparative table giving the results shows that the total quantity of alkaloids extracted is somewhat greater in the case of the tinctures containing glycerin than in that of the tinctures made with the spirit alone. The same is true for the total amount of extractive ; but in neither case is the difference greater than might result from experimental error.—Pharm. Jour., Aug. 17, 1895, 145 ; from Proc. Brit. Pharm. Conf., 1895.

In a subsequent communication to Pharm. Jour. (Aug. 10, 1895, 136), the author explains some of the references in his table. Thus the percentage of alkaloids in the tinctures applies to a tincture containing or representing 5 ozs. of the bark in a pint (Imperial measure). The question of the strength of the menstruum does not appear to have struck him as being left in doubt.

*Tinctura Croci, B. P.*—*Rapid Determination.*—Alexander Gunn has observed that tincture of saffron rapidly loses its tinctorial power when exposed in partially filled bottles, whilst in well filled bottles it appears to keep well. He records a number of experiments made, which indicate that the loss of color is due to the action of the air, and not to exposure to light, though direct sunlight was avoided. An interesting observation in this connection is that the sulphuric acid test applied to the bleached tincture is not available. This test depends upon the production of a fine purple-blue coloration when 5 Cc. of the tincture are shaken with 20 Cc. of dilute caustic soda and 10 Cc. of ether, the ether decanted, evaporated, and the residue moistened with sulphuric acid. The reaction with the bleached tincture was found to be practically as strong as with a tincture recently prepared, with this difference, however, that the bluish color was almost instantaneously followed by the redder shades.—Chem. and Drugg., Nov. 30, 1895, 796-797.

*Tinct. Ferri Acetici Rademacheri*—*Improved Formula.*—Evers proposes the following formula for making tinct. ferri acetici Rademacheri: 254 p. of calcium carbonate are dissolved in 1594 p. of water and 1016 p. of diluted acetic acid. This solution is mixed with a solution of 920 parts of ferrous sulphate in 2720 p. of water and 800 p. of diluted acetic acid ; 820 p. of alcohol of 91 per cent. are then added, and the mixture, after standing several hours, is filtered and divided in a sufficient number of bottles so that they may be half filled ; these being preserved in a cool place, and frequently opened and shaken during two months. The filtered liquid then has the prescribed darkened color, and the characteristic madeira-like odor. Its sp. gr. is 0.979 to 0.981, and the preparation contains 1.095 to 1.131 per cent. of iron.—Pharm. Centalh., Feb. 27, 1896, 129 ; from Pharm. Ztg., 1896, 22.

*Tincture of Iodine*—*Influence of Light and of the Purity of Alcohol on Its Stability.*—Popiel reports upon experiments made with three samples

of tincture of iodine, one made with chemically pure alcohol, a second purchased in Warsaw, and a third made by adding 2 per cent. of amyl alcohol to the commercial sample. He found that decomposition began in the third sample after the first week, whilst it began only after two weeks in the first and second samples; in all cases, however, the decomposition was very slow, being scarcely appreciable after three weeks, and after three months the tincture still responded to the prescribed tests of purity of the Russian Pharmacopœia. The most noteworthy observation of the author is that the decomposition of tincture of iodine is accelerated, though only in a slight degree, in the dark.—Pharm. Centralh., July 11, 1895, 404; from Wiedomosci Farmaceutyczne, 1895, 135.

*Colorless Tincture of Iodine—Review of Different Methods of Preparation.*—R. C. Dickinson reviews the different methods for preparing the so-called decolorized tincture of iodine, and concludes that the name is a misnomer, since it contains no free iodine, and that the preparation is a “chemical humbug.” By the following method, which is similar to that of the Germ. Pharm., and Nat. Formulary, he obtains a preparation which is perhaps more satisfactory than those in common use: Dissolve 20 grammes each of iodine and sodium hyposulphite in 20 grammes of water by very gentle heat. Cool, add gradually and carefully 15 grammes stronger water of ammonia, and finally 150 grammes deodorized alcohol. After eight days filter in a covered funnel, and preserve for use. This preparation contains sodium iodide, ammonium iodate, and some sodium tetrathionate, the greater part of the latter salt crystallizing out during the process, and being removed by filtration. Prepared in this way, the preparation does not acquire that decayed-radish-like odor peculiar to some of the preparations.—Proc. Georgia Phar. Assoc., 1895, 38–39.

*Tincture of Lobelia, B. P.—Difficulty to Follow the Official Requirements.*—J. F. Liverseege finds that while the B. P. requires the lobelia to be used in form of No. 40 powder, when it is attempted to reduce the drug to this condition in a mortar only about 40 per cent. could be passed through the sieve, the remainder being stems and stalks, which could not be powdered. Experiments are recorded by the author (in the form of a table) which show that a tincture prepared from the No. 40 powder obtained is about one-half stronger in alkaloid and extractive than a tincture prepared from the stalks, and he suggests that the formula and directions should be so modified as to leave no doubt as to the intention of the Pharmacopœia.—Pharm. Journ., Aug. 17, 1895, 141; from Proc. Brit. Pharm. Conf., 1895.

*Tincture of Myrrh, B. P.—Method of Preparation and Commercial Quality.*—J. F. Livermore has made some experiments upon the B. P. process for preparing tincture of myrrh, and sees no reason why percolation should not be resorted to rather than the maceration directed. A properly

prepared tincture should yield about 4 per cent. of residue upon evaporation. Its sp. gr. ranges from 0.846 to 0.858. Commercial samples (13) examined, agree well with these figures.—Chem. and Drugg., April 18, 1896, 559.

*Tincture of Opium—Preparation with Granulated Opium.*—Lyman F. Kebler and Chas. H. LaWall, in view of the recommendation by the Committee on Revision of the U. S. Pharm. of this Association (at the Denver meeting) "that *granulated* opium should be used in place of the powder, and that the use of precipitated phosphate of calcium should be omitted in the preparation of tinctures of opium, etc." have made some experiments which led them to endorse the recommendations made. They found that the use of granulated opium is characterized by its simplicity and ease of manipulation, the process being generally as follows: Into the lower orifice of a cylindrical percolator place a plug of absorbent cotton, introduce the opium loosely, without previous moistening; then press it down firmly and cover it with a filter paper, held in place by a suitable weight. Any desired menstruum can now be carefully poured on, and after due maceration (which may vary from 4 to 12 hours, according to the desire of the operator), percolation may be allowed to proceed, the rate of out-flow being so regulated as to exhaust the drug in the most thorough and speedy manner. The authors give the details of numerous experiments made, the results of which are exhibited in the following table:

Numbers.	Process used.	Per cent. of Morphine in Opium.	Per cent. of Morphine in Tincture.	Per cent. of Morphine lost.	Time allowed for Maceration.	Time consumed in Percolation.
1	U. S. P., 1890 .....	14.09	1.200	2.09	—	6 days.
2	" " .....	13.92	1.195	1.97	—	2 days.
3	Granulated opium ...	12.15	1.183	0.32	12 hours.	10 hours.
4	" " ....	12.15	1.180	0.35	4 hours.	6 hours.
5	" " ....	14.35	1.370	0.65	4 hours.	10 hours.
6	" " ....	14.35	1.370	0.65	12 hours.	10 hours.
7	" " ....	14.35	1.375	0.60	12 hours.	10 hours.
8	" " ....	13.70	1.355	0.15	12 hours.	24 hours.
9	" " ....	14.25	1.390	0.35	12 hours.	24 hours.
10	" " ....	14.35	1.370	0.65	12 hours.	10 hours.
11	" " ....	14.35	1.398	0.37	12 hours.	24 hours.
12	U. S. P., 1890 .....	13.92	1.252	1.40	—	3 days.
13	" " .....	14.48	1.206	2.42	—	4 days.

Inquiries made by the authors revealed the fact that only a small percentage of druggists follow the official process strictly, the majority using a more speedy method, and they conclude that the U. S. P. process should be so amended as to secure its popular adoption without in any way sacrificing the quality of the product.—Amer. Jour. Pharm., Nov., 1895, 554-558.

*Extract of Vanilla—Improved Preparation of a Cheap Article.*—Frank Edel states that instead of using tonka bean to make cheap extract of vanilla, he uses Tahiti vanilla, the following formula giving a satisfactory preparation: Grind 8 oz. each of Tahiti vanilla and Mexican vanilla in a small-sized Enterprise M'fg Company's meat chopper (which is admirably adapted for the purpose), and percolate with diluted alcohol to  $2\frac{1}{4}$  gallons; then add 1 quart simple syrup. The extraction of the chopped vanilla is perfect.—Amer. Drugg., Nov. 11, 1895, 279.

*Flavoring Extracts—Formulas.*—Frank Edel communicates the following formulas for flavoring extracts, in which he uses a certain proportion of "linalyl formate," a liquid which has an aroma resembling the oils of petit grain and bergamot:

*Extract of Apricot.*—Linalyl formate, 90 minims; amyl valerianate, 4 drachms; fluid extract of orris, 1 oz.; glycerin, 1 oz.; alcohol, 11 ozs.; water, enough to make 1 pint.

*Extract of Apple.*—This is made with the same ingredients in the same proportions as the extract of apricot, with the exception of linalyl formate, of which only half the quantity (= 45 minims) is used.

*Extract of Quince.*—Linalyl formate, 90 minims; pelargonic ether,  $1\frac{1}{2}$  oz.; fluid extract of orris, 1 oz.; glycerin, 1 oz.; alcohol, 70 per cent., enough to make 3 pints.

*Extract of Peach.*—Linalyl formate, 120 minims; amyl valerianate, 1 oz.; cœnanthic ether, 2 drachms; oil of rue (pure German), 30 minims; chloroform, 2 drachms; fluid extract of orris, 2 ozs.; glycerin, 2 ozs.; alcohol, 70 per cent., enough to make 3 pints.—Amer. Drugg., Nov. 11, 1895.

#### VINA MEDICATA.

*Medicated Wines—Revision of Formulas*—E. Dieterich in a recent supplement (1896) to his "Neues Pharmaceutisches Manual," makes some suggestions concerning the revision of formulas for medicated wines for the forthcoming supplement to the Germ. Pharm. The vinous form of medicaments is justified mainly on account of the taste in preparations that are given in large doses; but for preparations that are given in small (drop) doses, the wine is regarded as an unsuitable menstruum, and should be replaced, as in the case of *tinctura opii crocata*, Ph. G., by diluted alcohol. For the extraction of vegetable drugs containing alkaloids—such as coca, colchicum, ipecacuanha, etc.,—wine is particularly unsuited, because the tannin in the wine precipitates the alkaloids, and because the wine does not contain sufficient alcohol to redissolve the precipitates. It would be necessary, therefore, to add at least 10 per cent. of alcohol, or to detannate the wine before using it for the extraction of the drug. In place of wine, he suggests a mixture of 45 p. cognac, 45 p. water, and 10 p. honey, as being more efficient and quite as pleasant, in so far at least as odor is concerned.—Pharm. Centralh., May 21, 1896, 311.



*Wines of the B. P.—Criticism.*—The Pharm. Journal (Feb. 1, 1896, 86–87) makes some criticisms on the wines of the B. P. which serve a useful purpose mainly for the forthcoming revision of that standard. The use of wine as a menstruum or vehicle for the administration of drugs is an old-fashioned custom, the origin of which is probably due to the fact that wine was formerly the most convenient, and generally available, alcoholic fluid. At the present time the use of wine as a menstruum or vehicle for any particular drug requires to be justified by the following conditions: The drug must be easily and thoroughly susceptible of exhaustion by weak alcohol, and the wine must have the property of masking the taste or modifying the character of the taste so as to make the preparation palatable.

#### MISCELLANEOUS FORMULAS.

*Surgical Dressings—Assay Processes.*—Chas. E. Parker recommends several methods for assaying surgical dressings which are based upon practical experience, and may be briefly outlined as follows:

*Salicylated Dressing.*—One or two grams of the dressing are moistened with caustic soda solution and percolated to complete extraction with water. The percolate is then acidified and shaken out with ether; the ether solution is washed with distilled water, evaporated spontaneously, and the residue dissolved in an excess of  $\frac{N}{50}$  sodium hydrate; litmus is added as indicator, and the solution is then titrated with  $\frac{N}{50}$  sulphuric acid at a boiling temperature. Each Cc. of  $\frac{N}{50}$  sodium hydrate solution in the difference represents 0.00276 gram of salicylic acid.

*Benzoated Dressing.*—To determine the benzoic acid in the dressing, 1 square foot of gauze or 5 grams of cotton are distilled with steam until the distillate no longer shows an acid reaction to neutral litmus. The distillate is treated with excess of  $\frac{N}{100}$  sodium hydrate, and titrated with  $\frac{N}{100}$  sulphuric acid, using litmus or phenolphthalein as indicator. Each Cc. of  $\frac{N}{100}$  sodium hydrate solution in the difference represents 0.0122 gram of benzoic acid.

*Styptic Cotton.*—The iron in styptic cotton is determined by macerating 3 to 5 grams in 50 Cc. of distilled water. The ferric salt is reduced by adding stannous chloride in hydrochloric acid solution until the brown color disappears, then removing the excess of stannous chloride by the addition of mercuric chloride as long as a precipitate is produced, and finally titrating the ferrous salt with  $\frac{N}{100}$  potassium bichromate solution until a drop tested on a white plate no longer gives a blue color with a drop of fresh potassium ferricyanide solution, but only a bluish-gray color. One Cc. of the  $\frac{N}{100}$  potassium bichromate consumed represents 0.0056 gramme of metallic iron, or 0.027 gramme of ferric chloride, U. S. P.—Drugg. Circ., Oct., 1895, 231.

*Sterilized Surgical Dressings—Modification of Sterilizer.*—Edmund

White supplements a paper upon sterilized surgical dressings, communicated in vol. xxii. of the St. Thomas's Hospital Reports, by a paper read before the British Pharmaceutical Conference at Bournemouth, in which he makes some important suggestions based upon the experience since gained. He proposes the introduction of a trap or condensed water box in the steam-pipe leading from the boiler to the sterilizer, thereby preventing condensed water from being blown into the latter when steam is first turned on. Then, a disc or plate with fine perforations should be placed over the orifice of the steam-pipe where it enters the sterilizer, thereby securing the equal distribution of the steam. The pressure should not be allowed to rise higher than 10 to 15 lbs. to the square inch, because at the temperature corresponding to 20 lbs. pressure, originally proposed, the dressing materials are liable to become rotten and slightly charred. Furthermore, when the dressings are in place steam is turned on slowly, the tap at the bottom being left open to allow the air to be displaced by the steam entering at the top. When steam begins to escape at the bottom tap, this is closed and the pressure allowed to rise to 10 lbs. Steam is then shut off and the bottom tap is fully opened, when the excess of steam rushes out, carrying with it the bulk of the air not previously displaced. This operation, which occupies three to five minutes, is then repeated before sterilization proper is commenced, and serves to secure a thoroughly moist atmosphere. With regard to the receptacle for holding the dressings, the author has been forced to give up the use of glass jars, on account of the frequent and unavoidable breakage occurring on their removal from the sterilizer when the process is ended. He has tried various materials, zinc, copper, tinned copper, nickled copper, and aluminium, and finds the last named to be the most satisfactory of all; but tinned copper also answers well, and being much cheaper is recommended on the score of economy. The details concerning the shape, size, etc. of these vessels, the manner of their removal from the sterilizer, etc., are given in the present paper, which see in Pharm. Journ., Aug. 17, 1895, 138-139; from Proc. Brit. Pharm. Conf., 1895.

*Ferripyrine Surgical Dressings — Advantage over ordinary Styptic Dressings.*—The compound of antipyrine and ferric chloride, introduced under the trade-name "ferri-pyrine," is now utilized by a German manufacturer for preparing an 18 per cent

*Ferri-pyrine Absorbent Cotton*, by a process which is patented. The cotton so prepared is said to have the advantage over ordinary styptic cotton—prepared with ferric chloride—that its action is more intense and at the same time almost painless.—Amer. Drug., June 10, 1896, 334.

*Celluloid Covering for Wounds—A Substitute for Ordinary Bandages.*—Dr. Salzmann at the March meeting of the Berlin Medical Society gave a description of a kind of celluloid capsule designed for the covering of

wounds. He has found this in many cases to be of very great advantage in replacing bandages for the prevention of the contamination of the wound from external sources. The new covering does not interfere with the movement to the same extent as do bandages.—*Amer. Drug.*, May 10, 1896, 275.

*Iodoform Gauze—Preparation.*—G. von Nerom gives the following formula and process for preparing iodoform gauze: Three meters of absorbent gauze are loosely folded and rolled so as to fit into a vessel of 500 Cc. capacity, and a solution of 30 Gm. iodoform, 10 Gm. resin, and 300 Gm. ether, is poured over it. As soon as the gauze has absorbed all of this solution, it is spread out so that the ether may evaporate. The quantity of iodoform, it will be noted, is here not in relation to the weight of the gauze, but is in relation to a definite measure, which, the author thinks, is the proper relation.—*Pharm. Centralh.*, Nov. 14, 1895, 665; from *Annales de Pharm.*, 1895, 413.

*Iodoform Gauze—False Representation of Strength.*—Attention is drawn to iodoform gauzes occurring in German commerce which contain less iodoform than is claimed by the label. A sample of 10 per cent. iodoform gauze—so designated—contained only 5.1 per cent., and a so-called 30 per cent. gauze, only 8.2 per cent. of iodoform. The editors of *Pharm. Centralh.* (Oct. 17, 1895, 594), obtained samples of iodoform gauze direct from manufacturers. Three samples offered as 10 per cent. iodoform gauze contained respectively 7.78, 6.73, and 9.85 per cent., whilst two of 30 per cent. gauze yielded only 11.42 and 12.3 per cent. of iodoform respectively. It was determined, for the purpose of control, that iodoform loses about 2.1 per cent. on drying over sulphuric acid, but this does not explain the loss in the gauze examined.

*Dermatol Gauze—Preparation.*—Dinkler recommends the following method for preparing dermatol gauze: A thick mucilage of gum (the author uses the gum remaining from the preparation of tincture of myrrh) is prepared, and 10 Gm. of dermatol are mixed to a smooth paste with 5 Gm. of the mucilage, then diluted with 200 Gm. of water, in which the dermatol easily remains suspended. The rolled gauze bandage is then introduced into the mixture, and readily becomes impregnated, even tightly rolled bandages of 100 Gm. being easily penetrated by this dermatol mixture.—*Pharm. Centralh.*, Jan. 2, 1896, 13; from *Pharm. Ztg.*

*Iodized Cotton—Preparation.*—Soulard finds the best method of preparing iodized cotton is to bring the vapor of iodine in contact with ordinary—not absorbent—cotton, at a temperature of 90° to 100° C. Contrary to the assumption of the Codex, the author is of opinion that part of the iodine enters into combination with the cellulose to form several compounds.—*Pharm. Jour.*, Sept. 28, 1895, 264; from *Jour. de Phar.* (6), xv, 255.

*Aseptic Catgut—Preparation.*—Dr. Charles Rice, after reviewing the conditions demanded by surgeons for sterilized catgut, the various methods that have been employed for its preparation and preservation, communicates the method which in his own experience has proved most effectual. For this purpose only the very best, smooth (not rough) musical strings should be used. Under ordinary circumstances five sizes are sufficient. These are violin D, A and E, and first and second banjo strings. These, in the course of their manufacture, are coated with oil, so that they become more or less impervious to ordinary solvents, and treatment merely with an aqueous solution of carbolic acid, or with cold alcohol, with or without some antiseptic salt, is by no means to be trusted. It is essential, therefore, that all fatty matter be extracted from the gut, the methods exclusively employed in the public hospitals (of New York) being one of the following :

1. Maceration in oil of juniper and subsequent boiling with alcohol of 94 per cent., then transferring to and keeping in chloroform saturated with biniodide of mercury.
2. Treatment as under No. 1, but with omission of the maceration in oil of juniper.
3. Simple maceration for at least 48 hours in chloroform saturated with binionide of mercury. The strings are left in the solution and taken out as wanted.

The third method is all sufficient, and in the

*Biniodized Chloroform* the author has found one of the most effective sterilizing agents, while at the same time it has not the least weakening effect upon the tenacity of the gut. Nevertheless it is deemed advisable to use an additional precaution, to subject the catgut to a preliminary sterilization, as under No. 2, by boiling it with enough alcohol of 94 per cent. to keep it covered. This is done in a large wide-mouthed Erlenmeyer flask, to the neck of which is fitted an upright condenser (the author uses Allihn's glass condenser, the condensing tube of which has a number of bulb-like expansions) to prevent the loss of alcohol. The flask is set upon a steam bath and the boiling kept up for an hour. The strings are then taken out and immediately transferred to the biniodized chloroform, in which they are left until wanted. When they are taken out for use, they are placed between folds of sterilized gauze for a minute or so to allow the chloroform to volatilize. They will now be found beautifully clean and more or less bleached, and to have lost none of their strength.

The biniodized chloroform is prepared by adding 35 grains of biniodide of mercury, free from lumps, to 5 pounds of pure chloroform contained in a flask provided with an upright condenser, and boiling until the biniodide is dissolved, which requires about half an hour. It is then transferred to bottles, which must be well stoppered, and contains 1 : 1000 ; but a portion of biniodide will separate out at and below 60° F., which is, however, of no consequence unless the liquid is exposed to great cold.—Amer. Drugg.,

May 10, 1896, 276, 277; from Alumni Journ., N. Y. Col. Pharm., May, 1896.

*Catgut—Sterilization with Formalin.*—H. Vollmer recommends the sterilization of catgut by placing it into a 2 per cent. formaldehyde solution, and drying it at 60° or preserving it in a 0.5 per cent. solution of formaldehyde. If it is to be kept for a long time, however, he prefers to keep it instead in sterilized Tavel's solution (sodium chloride of 7.5; sodium carbonate, 2.5: water, 1000.0). Formalin catgut is resorbed with more difficulty than catgut that has been sterilized with cumol.—Pharm. Centralh., Feb. 13, 1896, 99; from Centralbl. f. Gynæcology, 1895.

*Up to Date Perfumes—Various Formulas.*—C. H. Dubelle publishes the following formulas for "up to date perfumes" in "Chem. aud Drugg." (June 20, 1896, 873):

*Antiseptic Cologne.*—Chloride of sodium,  $\frac{1}{8}$ ; corrosive sublimate,  $\frac{1}{8}$ ; otto of rose,  $\frac{1}{4}$ ; oil of cinnamon,  $\frac{1}{4}$ ; oil of bergamot,  $\frac{1}{2}$ ; oil of rosemary,  $\frac{1}{2}$ ; tincture of musk, 1; tincture of ambergris, 2; oil of neroli petale, 1; oil of lemon,  $1\frac{1}{4}$ ; oil of orange,  $1\frac{1}{4}$ : extract of orange flower, 9; rectified spirits, 112 ounces. Mix and filter. Useful for purifying sick-rooms by sprinkling on the floor, bedding, etc.

*Pine Forest Cologne.*—Oil of lemon,  $\frac{1}{2}$ ; oil of bergamot,  $\frac{1}{2}$ ; oil of Mitcham lavender,  $\frac{1}{2}$ ; tincture of civet, 1; tincture of ambergris, 1; oil Australian eucalyptus, \*: oil of pinus picea, 4; spirit of rose-geranium,  $7\frac{1}{2}$ ; rectified spirit, 112 ounces. Mix and filter.

*Tasmania Water.*—Otto of rose,  $\frac{1}{8}$ ; oil of orange,  $\frac{1}{4}$ ; oil of limes,  $\frac{1}{4}$ ; oil of lemon, 1; oil of Australian eucalyptus, 5; tincture of ambergris,  $2\frac{1}{2}$ ; spirit of rose-geranium,  $7\frac{1}{2}$ ; rectified spirit, 112 ounces. Mix and filter.

*Costa Rica Water.*—Oil of neroli petale,  $\frac{1}{2}$ ; otto of rose, 1; tincture of musk, 1; tincture of ambergris, 1; oil of ylang-ylang, \*; spirit of vanillin, \*; extract of jasmín, 16; rectified spirit, 112 ounces. Mix and filter.

*Biflora Cologne.*—Otto of rose,  $\frac{1}{8}$ ; oil of neroli petale, \*; oil of cloves,  $\frac{1}{2}$ ; oil of bergamot,  $\frac{3}{4}$ ; oil of orange,  $\frac{3}{4}$ ; oil of verbena, \*; oil of Mitcham lavender, 1; tincture of ambergris, 4; eau de millefleurs, 8; rectified spirit, 112 ounces. Mix and filter.

*Aloysia Cologne.*—Oil of bergamot,  $\frac{1}{4}$ ; oil of orange,  $\frac{3}{4}$ ; oil of verbena, \*; tincture of ambergris, \*; oil of lemon, \*; spirit of rose-geranium, 4; esprit de rose triple, 4; rectified spirit, 112 ounces. Mix and filter.

*Sachet Powders—Various Formulas.*—Frank Edel communicates a number of formulas for sachet powders, as follows:

*Heliotrope Sachet Powder.*—Orris, in fine powder, 7 ozs.; tonka bean, ground, 4 drachms; rose leaves, ground, 2 ozs.; heliotropine, 1 drachm;

\* Here the quantities are omitted, possibly by a defect or error in the print.—Rep.

tincture of musk, 2 drachms ; oil of rose, 6 drops ; oil of bitter almond, 3 drops. Mix intimately, and keep in a tightly covered vessel for several days to blend.

*Tincture of Musk* for this purpose may be made from the artificial musk known as "musk Baur," which the author finds to answer excellently as a substitute for true musk ; 2 drachms being dissolved in 1 pint of deodorized alcohol.

*Violet Sachet Powder.*—Orris, in fine powder, 3 pounds ; essence of bergamot (1 to 9), 30 minims ; oil of almonds (bitter? Rep.), 20 minims ; oil of rose, 20 minims ; tincture of musk, 1 oz. ; cassia flowers, 4 ounces. Mix intimately.

*Rose Sachet Powder.*—Orris, in fine powder, 8 ozs. ; sandal-wood, in No. 40 powder, 4 ozs. ; rose leaves, coarse powder, 24 ozs. ; patchouly, in No. 40 powder, 2 ozs. ; tincture of musk, 2 ozs. ; rose geraniol, 1 drachm. Mix intimately. The "rose geraniol" answers as well as otto of rose in this powder, and better than oil of rose geranium.—Amer. Drugg., Nov. 11, 1895, 279.

*Fumigating Paper and Tapers—Preparation.*—The following formula and method for preparing fumigating paper and tapers is given in "Amer. Drugg." (April 25, 1896, 245) : Rub together 50 p. benzoin, 50 p. tolu, and 10 p. storax ; exhaust with 300 p. alcohol, and in the filtrate dissolve 10 p. Peru balsam, and one-tenth of 1 p. each cinnamon oil and lavender oil. With the liquid so obtained, drench blotting paper or splints of soft wood, and allow them to dry.

*Tooth Powder and Paste—Preparation with Strontium Carbonate and Sulphur as a Basis.*—Prof. Métal recommends strontium carbonate and flowers of sulphur for making tooth powder and paste. *The powder* is made by perfuming 15 Gm. each of the strontium carbonate and purified sulphur, with 6 drops of oil of rose ; *the paste*, by mixing 6 Gm. strontium carbonate, 3 Gm. purified sulphur, and 13.5 Gm. of medicinal soap with sufficient glycerin and mucilage of gum arabic, and perfuming with 6 drops of oil of rose.—Pharm. Centralh., June 2, 1896, 10.

*Paste Dentrifice—Improved Formula.*—Frank Edel remarks that a common fault of paste dentrifices, dispensed in tubes, is that the product is prone to separate, allowing the softer portions to squirt from the tube at the slightest pressure. The difficulty is overcome by incorporating a little gelatin with the glycerin which is usually employed to form the paste, and he gives a formula for

*Gelatin-Glycerin Solution*, as follows : Moisten 2 drams of gelatin with 1½ ozs. of water, allow to stand half an hour (then heat? Rep.) and add 5 ozs of glycerin.

To make the "paste dentrifice," mix intimately : Prepared chalk, 5 ozs. ; magnesium carbonate, 2 drams ; powdered orris root, 1 oz. ; thymol, 30

grains, and moisten the powder with the solution obtained as above. If the paste turns out too thick, it can be diluted by adding more glycerin. —Amer. Drugg., Nov. 11, 1895, 279.

*Liquid Dentifrices—Formulas.*—The following formulas for liquid dentifrices are given in "Brit. Journ. Dent. Science" :

I. Castile soap,  $13\frac{1}{2}$  ozs. ; water, 54 ozs. ; glycerin, 36 ozs. (by weight) ; alcohol, 3 pounds, 6 ozs. ; oil of peppermint, 1 oz.  $5\frac{1}{2}$  drachms ; oil of wintergreen, 1 oz.  $5\frac{1}{2}$  drachms ; syrup,  $4\frac{1}{2}$  pounds ; tincture of cudbear, 9.0, to tint. Filter.

II. Castile soap,  $12\frac{1}{2}$  ozs. ; water, 54 ozs. ; glycerin, 36 ozs. ; alcohol, 54 ozs. ; oil of peppermint, 13 drachms ; oil of wintergreen, 14 drachms ; oil of lavender, 1 drachm ; oil of cassia, 1 drachm ; oil of cloves, 1 drachm ; oil of sassafras, 1 drachm ; chloroform, 2 drachms ; tincture of cudbear, 6 drachms. Macerate for several days and filter. To be used by pouring a small quantity on a wet tooth brush.—Amer. Drugg., Oct. 10, 1895, 216.

*Mouth Wash—Vian's Formula.*—According to "Pharm. Centralh." (July 4, 1985, 393,) this is prepared as follows : Salicylic acid, 1.0 Gm. ; chloroform, tincture of benzoin, tincture of cinnamon, each 10.0 Gm. ; aromatic alcohol (? Rep.), 130 Gm. Two teaspoonfuls of this are used to a glass of water.

*Complexion Wash—Formula.*—Frank Edel communicates the following formula for an excellent lotion for the complexion ; Resorcin, 2 drachms ; magnesium sulphate, 2 drachms ; zinc sulphocarbolate, 2 drachms ; glycerin, 3 ozs. ; cologne water, 6 ozs. ; mucilage of quince (from  $\frac{1}{2}$  oz. of seed), 1 pint ; water, enough to make 2 pints. Make a solution. This is to be preferred to many of the advertised compounds, and is a superior preparation for freckles and roughness of the skin.—Amer. Drugg., Nov. 11, 1895, 279.

*Hair Tonic—Approved Formula.*—C. E. Battles communicates the following "approved" formula for a hair tonic : Quinine sulphate, 15 grs. ; borax, 1 dr. ; cologne, 2 fl. ozs. ; tincture of cantharides, 3 fl. dr. ; ammonia water, 1 fl. dr. ; glycerin, 3 fl. ozs. ; alcohol, 6 fl. ozs. ; tincture of cudbear, sufficient to color ; water enough to make 16 fl. ozs. Dissolve the borax in 2 ounces of water, to which add the ammonia. Dissolve the quinine in the alcohol, add the cologne, tincture of cantharides, and glycerin ; mix the two solutions, add the balance of the water, and sufficient tinct. of cudbear to color, and filter after standing twelve hours.—Merck's Market Rep., Aug. 15, 1895, 331.

*Dry-Shampoo—Formula.*—A formula for "ammonia dry-shampoo," which forms a ball of lather on the head and rubs away to nothing, is given in Chem. and Drugg. (July 6, 1895, 39), as follows : White castile soap, in fine shavings, 1 oz. ; oil of lavender, 1 drachm ; rectified spirits, 8 ozs. ; water, 2 ozs. Digest for a week, filter, and add  $2\frac{1}{2}$  ozs. ammonia water.

*Hot Soda—Dispensing Hints.*—"Galen, Jr." communicates some hints on dispensing "hot soda," gives a list of beverages that are in popular demand, and formulas for some of the syrups that are favorites: Chocolate, cream chocolate, coffee, lemon, raspberry; also for beef tea and clam bouillon.—See Amer. Drugg., Dec. 10, 1895, 341.

*Castor Oil Soda—Method of Dispensing.*—W. H. Hosteley makes some practical observations concerning the dispensing of castor oil at the soda fountain. He has employed for this purpose with satisfaction a syrup prepared according to the following formula: Aromatic fluid extract of yerba santa,  $\frac{1}{2}$  oz.; fluid extract of licorice,  $1\frac{1}{2}$  ozs.; oil of cloves, 18 minims; oil of gaultheria, oil of cinnamon, of each  $\frac{1}{2}$  drachm; magnesium carbonate, 2 drachms; alcohol, 1 fl. oz.; syrup, 12 fl. ozs.; simple elixir, enough to make one pint of filtrate. A glass of frothy soda is drawn with this syrup, the oil—which must be fresh and sweet—is poured on top, and the dose may then be taken without inconvenience. Other practical remarks are made by the author with minuteness of detail, to which reference must be had in the original paper, in Drugg. Circ., Nov., 1895, 255.

*Toothache Drops—Selected Formulas.*—The following carefully selected formulas for toothache drops are given in "Amer. Medico-Surg. Bulletin:"

1. Rectified oil of cajuput, 1 p.; oil of cloves, 1 p.; chloroform, 2 p.—Mix.

2. Triturate 2 drachms each of camphor and chloral hydrate until liquefied, then add enough spirit of peppermint to make 4 fluid ounces.

3. Mix equal parts of oil of peppermint, tincture of cannabis indica, and chloroform.

4. Mix equal parts of oil of peppermint, spirit of ether, and tincture of opium.

5. Menthol, 2 drachms; ether, 4 fl. drachms; oil of cloves, 2 fl. drachms; fld. ext. aconite, 1 fl. drachm; mix.

6. Add 20 minims of oil of peppermint and 1 fl. ounce of ether to 1 pint of fld. ext. Jamaica dogwood, and mix.

7. Mix together 2 p. creosote, 2 p. chloroform, 1 p. tinct. benzoin, and 4 p. wine of opium.

8. Oil of eucalyptus, 1 fl. dr.; mastic, 2 dr.; camphor,  $1\frac{1}{2}$  oz.; morphine (alkaloid)  $1\frac{1}{2}$  dr.; chloroform, 2 fl. oz.; alcohol, enough to make 5 fl. ozs.

9. Camphor 1 p., dissolve in chloroform, 9 p.

10. Mix equal parts of rectified oil of cajuput and tincture of opium.—Amer. Drugg., May 10, 1896, 277.

*Eye Water—Approved Formula.*—C. E. Battles communicates the following "approved" formula for an eye water: Zinc sulphate, 20 grs.; copper sulphate, 5 grs.; tincture of saffron, 2 fl. dr.; tincture of camphor, 1 fl. dr.; rose water, distilled water, of each 8 fl. ozs. The solids to be dissolved in



a mixture of the liquids, and the solution filtered after standing a day or two.—Merck's Market Rep., Aug. 15, 1895, 331.

*New Vesicant Salve—Formula.*—The "Il Farmaciste Italiano" gives the following formula for a mild and painless blistering salve: Menthol, 1 Gm.; chloral hydrate, 1 Gm.; cacao butter, 2 Gm.; spermaceti, 4 Gm. Make an ointment and spread on lint or on adhesive plaster.—Pharm. Jour., Aug. 31, 1895, 182.

*Inhalation for Pulmonary Complaints—Formula.*—The following formula is recommended as a spray for the apartments occupied by persons suffering from pulmonary complaints: Guaiacol, 5 Gm.; eucalyptol, 4 Gm.; carbolic acid, 3 Gm.; menthol, 2 Gm.; thymol, 1 Gm.; oil of cloves, 0.5 Gm.; alcohol (90 per cent.), 85 Gm.—Pharm. Centralh., April 2, 1896, 214; from Rev. de Thérap. Med.-Chirurg.

*Asthma Remedy—Composition.*—Süss has had occasion to subject a popular asthma remedy to examination, and finds it to be composed principally of stramonium leaves impregnated with a small quantity of salt-peter and mixed with a few per cent. of milfoil flowers. It constitutes a coarse powder, the fumes from which on burning it are inhaled, and are said to give infallible relief.—Pharm. Centralh., Oct. 10, 1895, 580.

*Remedy Against Foot Sweat—Formula.*—L. Heuser recommends the following formula for local application against profuse sweating, particularly the sweating of the feet: Balsam of Peru, 1 p.; formic acid, chloral hydrate, of each, 5 p.; alcohol, 85 p. The mixture is applied upon cotton to the part where the sweating is local, or in case of profuse general perspiration it may be applied with the atomizer. In persistent cases of local sweating he proposes the remedy double the above strength, or add 1 per cent. of trichloroacetic acid.—Pharm. Centralh., April 2, 1896, 214; from D. Med. Wochenschr., 1895, 732.

*Paste—Formaldehyde an Efficient Preservative.*—Frederick Lester records some experiments made to determine a good preservative for mucilages and pastes. The substances hitherto recommended for this purpose, oil of cloves, creosote, carbolic acid, lime water, hydronaphthol, etc., have not proven efficient in his hands. He regards *flour paste*, nicely made, as the most desirable adhesive that can be used by the pharmacist, but unfortunately it rapidly sours and becomes unfit for use. His present experiments, made with flour, gelatin and flour, dextrin, and acacia paste, have determined that the addition of a small quantity of a 40 per cent. formaldehyde solution preserves them perfectly. Thus, a flour paste made with 8 ounces of flour and 4 pints of water, adding one-half ounce of powdered alum before boiling, has kept well with the addition of one-half ounce of the formaldehyde solution, and even smaller quantities of the antiseptic seem to answer the purpose.—West. Drug., June, 1896, 245-246.

*Liquid Fish-glue—Formula.*—The "Süd-deutsche Apotheker Zeitung"

gives the following formula for a liquid fish glue, which is known by the name of "Syndeticon": Dissolve 100 parts of fish-glue in 125 parts of acetic acid, and 20 parts of gelatin in 125 parts of water. Mix the solutions, and then gradually incorporate 20 parts of shellac varnish.—West. Drug., March, 1896, 118.

*Cement for Bicycle Tires—Useful Formula.*—"Galen, Jr." communicates the following formula, which, he observes, will be found to make an excellent cement for mending bicycle tires: Macerate  $\frac{1}{2}$  oz. of crude rubber in 4 ounces of carbon disulphide for 24 hours; then dissolve 1 oz. of rosin and  $\frac{1}{4}$  oz. beeswax in 4 ozs. of the same solvent, and mix the two solutions.—Amer. Drugg., Oct. 10, 1895, 216.

*Acid-proof Cements—Preparation.*—A cement which will fasten glass or porcelain together firmly, and will not be affected by strong acids, is obtained, according to "Jour. de Phar. et de Chim.," as follows: Mix together 2 p. powdered asbestos, 1 p. barium sulphate, and 2 p. sodium silicate of 50° Beaumé strength. Another cement still firmer, since it is not attacked by hot acids, is obtained by mixing 2 p. sodium silicate, 1 p. finest sand, and 1 p. pulverized asbestos; and if potassium silicate is used instead of sodium salt, the cement will harden immediately, while otherwise it will require about an hour to set.—Amer. Drugg., April 25, 1896, 245.

*Solder for Glass—Composition.*—It is stated in Pharm. Centralh. (Nov. 14, 1895, 665), that an alloy of 95 parts of tin and 5 parts of copper, unites with glass so readily and rapidly that it may be used for soldering together glass tubes and the like with facility. The zinc is melted first, the copper is then added, and the melt well stirred. The addition of  $\frac{1}{2}$  to 1 per cent. of zinc or lead renders the solder more or less hard.

*Domestic Ammonia—Formula.*—The "Wiener Drogisten Zeitung," in view of the increasing use of ammonia in the household, publishes the following useful formula: Borax, 60 Gm.; oil cinnamon, 10 drops; oil cloves, 6 drops; oil citronella, 6 drops; alcohol, 3 Gm.; ammonia water, 7.5 liters.—Amer. Drugg., Febr., 1896, 79.

*A New Cleansing Agent—Formula.*—According to "Pharm. Post," a new cleansing agent for gloves, which is marketed under the name of "Ganlein," is prepared by dissolving 100 p. white castile soap in 30 p. distilled water by the aid of gentle heat, and then 30 p. sodium sulphate and 5 p. ammonia water are added.—Amer. Drugg., April 25, 1896, 245.

*Bijou Cleaning Fluid—Formula.*—The following formula for a cleaning fluid, under the above name, is given in "Chemist and Druggist," from American sources: Ether, 1 dr.; chloroform, 1 dr.; alcohol, 2 dr.; methyl salicylate,  $\frac{1}{2}$  dr.; deodorized benzin, 32 oz.—Reg. Pharm., Sept., 1895, 234.

*Detergent for Marble—Method of Application, etc.*—A correspondent of "Pharm. Ztg." recommends for the removal of spots from marble the application of a paste of bole and benzine, to be followed by a polishing

with a solution of 10 p. wax in 90 p. (oil of) turpentine.—*Amer. Drugg.*, April 25, 1896, 245.

*Litmus Pencil—A Useful Novelty.*—The "Chemical News" (April 24, 1896, 198) calls attention to a very useful and ingenious little appliance in the form of a "litmus pencil." This is about of the thickness and two-thirds of the length of an ordinary lead pencil in size. One-half is red and lettered "for alkalies," the other is blue and lettered "for acids." Its utility, especially to physicians, is obvious, and it furnishes a large supply of litmus, always ready for convenient use, which will doubtless cause it to supersede the old form of books. The ends should be provided with point-protectors, which do not appear to be supplied in the present form in which the pencil is marketed.

*Indelible Stamping Ink—Formula.*—Krause has subjected a commercial black indelible ink, recommended for marking linen by stamping, to examination, and finds it to contain, besides aniline black and other unimportant ingredients, a large percentage of free acid. The presence of the latter causes a destruction of the fabric that is stamped with this ink, and he therefore recommends the following formula, which produces a reliable non-corrosive article, though at probably twice the cost of the corrosive ink: Five parts of silver nitrate are dissolved in 10 parts of solution of ammonia, the solution is added to a solution of 5 parts of gum arabic and 7 parts of crystallized sodium carbonate, and the mixture is then carefully heated until it assumes a black color. This stamping ink is used in the hospital service of the German army, and has proven in every way satisfactory.—*Pharm. Centralh.*, Dec. 12, 1895, 709-710.

*Indelible Inks for Glass and Metal—Formulas.*—Schœbel recommends the following formulas for preparing white and black ink for writing indelibly on metallic utensils, reagent glasses, etc., used in microscopic laboratories:

*White Ink.*—1 p. permanent Chinese white (Windsor & Newton), or the same quantity of barium sulphate, is mixed with 3 to 4 parts of sodium silicate.

*Black Ink.*—1 p. liquid Chinese ink (E. Wolff & Son, London) is mixed with 1 to 2 parts of sodium silicate. The writing is done with an ordinary steel pen, which must be carefully cleaned after use. The characters written are not affected by the reagents ordinarily in use in microscopic laboratories, but are easily scraped off with a knife.—*Pharm. Centralh.*, Sept. 26, 1895, 558.

*Red Lemonade Color—Preparation from Beets.*—The following method for preparing a red coloring solution from beets is given in "Zeitschr. f. Kohlen. Ind.:" 5 parts of red beets are placed into a warm oven until they have become soft; they are then peeled, cut into slices, and macerated for 24 hours in 4 parts of diluted vinegar. The liquid is expressed,

evaporated in a water-bath to one-half, and mixed with an equal volume of 90 per cent. alcohol.—Pharm. Centralh., July 5, 1895, 393.

*Enamel for Cooking Utensils—Presence of Antimony.*—The "Zeitschr. f. Nahrungsm. Unters." calls attention to an analysis of an enamel for cooking utensils which is characterized by special brilliancy, but contains a large percentage of oxide of antimony, the composition being as follows: silica, 39.80; phosphoric acid, 2.73; alumina, 1.19; lime, 0.36; stannic oxide, 1.19; potassa, 7.72; antimony oxide, 14.32; soda, 8.92; boric acid (as difference), 14.92. Such an enamel is easily attacked by vinegar, and utensils glazed with it are therefore unsuitable from the hygienic standpoint.—Pharm. Centralh., Oct. 10, 1895, 586.

*Bengal Lights—Formulas for Safe Products.*—Dr. Otto Schaeffer recommends the following formulas for producing excellent colored lights free from danger:

*Green Light.*—Fuse 500 parts of the cheapest quality of shellac with 100 to 120 parts of barium nitrate carefully in an iron vessel, allow to cool, powder the cold mass, and mix from 12 to 30 parts of barium with it, *using the hand or a wooden pestle.*

*Red Light* may be made by fusing 500 parts of shellac and 100 to 120 parts of strontium nitrate, cooling and powdering in the same way as in the first case. Then, *when the "light" is to be used*, adding from 1 to 3 per cent. of potassium chlorate, under the same precautions; or, if the nitrate is thoroughly dry, it may be dispensed with altogether.—Amer. Drugg., Oct. 25, 1895, 258.

*Colored Fire Works—Formulas.*—"Galen, Jr." reviews the methods and precautions necessary to produce "fire works for the Fourth," successfully, and gives a large number of formulas, to which reference must be had by consulting the original paper. The following, respecting

*Liquid Colored Fires*, may, however, find place here. These may be made by dissolving certain substances to saturation in alcohol or other combustible liquid solvents. They are best ignited in a shallow iron pan, which for safety should be set in a pan of water. Using alcohol as the solvent and the substance in fine powder, the following colors may be produced: *Blue*, by zinc acetate; *green*, by boric acid; *red*, by strontium nitrate (or by making a strong tincture of lycopodium); *violet*, by potassium carbonate; *yellow*, by sodium nitrate; *white*, by camphor. A probably better method consists in mixing the finely-powdered substance with a moderately thick solution of shellac in alcohol.—Amer. Drugg., June 10, 1896, 327.

*Smokeless Colored Fire—Preparation.*—The following method of preparing "smokeless colored fire" is given in "Amer. Drugg." (April 25, 1896, 245): Heat barium or strontium oxide to a red heat; remove from the fire, and add one-fourth as much shellac as of strontia or baryta used.

Stir the mixture carefully until cool, so as to thoroughly incorporate the shellac, then pulverize. The addition of  $2\frac{1}{2}$  per cent. of powdered magnesium (metal, Rep.) very much enhances the effect of the colored fire.

*Smokeless Powder—Nature and Composition.*—The inventor of the new Maxim powder, in the course of a recent lecture, described it as containing 90 per cent. of pyroxylin possessing a very high degree of nitrates, with about 9 per cent. of nitroglycerin, and from  $\frac{3}{4}$  to 1 per cent. of urea. It is perfectly amorphous, and very hard and horn-like, the particles of which it consists being relatively long cylinders, perforated axially with numerous small holes, so that a minimum of burning surface is presented to the initial flame of combustion, and a comparatively less initial pressure recovered. In burning, the perforations increase in diameter, the combustion surface and consequent evolution of gases being thus greatly extended. The products of the combustion of the Maxim powder contain but little carbon dioxide, the pyroxylin giving off carbon monoxide mainly.—Pharm. Journ., May 23, 1896, 412.

*Tan Shoe Polish—Preparation.*—J. Pollard gives the following formula for a preparation that gives a nut-brown polish on tan shoes: Dissolve 10 ozs. of yellow bees' wax in two pints of oil of turpentine by means of a water bath in a close vessel; add a solution of 4 ozs. of yellow soap in 2 pints of water, stirring constantly until cold. Then with each ounce of cream produced mix thoroughly 5 Grs. of nankin brown dissolved in  $\frac{1}{2}$  drachm of alcohol.—Chem. and Drugg., July 6, 1895, 39.

*Russet Leather Dressings—Various Formulas.*—The following formulas for dressings for russet leather are given in "Amer. Drug." (April 25, 1896, 251):

No. 1. Dissolve 2 p. soft soap in 8 p. water, and add 8 p. annato solution (in oil); melt 3 p. beeswax, 3 p. linseed oil, and 8 p. turpentine (oil, ? Rep.) together, and gradually stir into it the soap solution, continuing the stirring until cool.

No. 2. Melt 16 p. palm oil and 48 p. common soap together at a gentle heat, and add 32 p. oleic acid; dissolve 1 p. tannic acid in 10 p. glycerin, add to the hot soap and oil mixture, and stir until cold.

No. 3. Dissolve 9 parts yellow wax in 20 p. oil of turpentine with the aid of a water bath, and 1 p. common soap in 20 p. boiling water; mix the two solutions in a hot mortar, and stir until cold.

*Roach Exterminators—Various Formulas.*—The following formulas for roach exterminators are given in "Amer. Drug." (April 25, 1896, 251):

No. 1. Mix together, wheat flour, 2 p.; powd. sugar, 4 p.; powd. borax, 1 p.; unslaked lime, 1 p., and keep dry.

No. 2. Powdered borax, 37 p.; starch, 9 p.; cocoa, 4 p. Mix.

No. 3. Plaster of Paris, 2 p.; oatmeal, 4 p.; sugar, 1 p. Mix.

No. 4. Powd. Angelica root, 5 p.; essence of eucalyptus, 1 p. Mix well.

No. 5. Phosphorus, 1 p.; warm water (70° C.), 16 p.; molasses, 8 p.: suet or lard, 16 p.; oatmeal or flour, enough to make a paste.

No. 6. Red lead, 1 p.; Indian meal, 2 p.; molasses, enough to make a paste.

*Fertilising Compounds—Various Formulas.*—The following formulas are given in "Rev. Chim. Ind." for preparing fertilizers suitable for different purposes:

*Fertiliser for Gardens:* Ammonium sulphate, 10; sodium nitrate, 15; ammonium phosphate, 30; potassium nitrate, 45 parts.

*Fertiliser for Lawns:* Potassium nitrate, sodium nitrate, calcium sulphate, calcium superphosphate, of each, 30 parts.

*Fertiliser for Fruit Trees:* Potassium chloride, 100 Gm.; potassium nitrate, 500 Gm.; potassium phosphate, 570 Gm. This quantity to be used for one tree.—West. Drugg., March, 1896, 118.

*Chemical Guano, Grandeau* (For pot plants): Calcium nitrate, 100 Gm.; potassium nitrate, potassium phosphate, magnesium sulphate, of each 25 Gm. Dissolve 4 to 10 Gm. of this in a liter of water, and water each pot plant—which must be in full vegetation—with this once or twice a day.—West. Drugg., March, 1896, 118; from Rev. Horticult.

### C. NEW REMEDIES.

(*Remedies introduced under coined titles, or for which the formulas are withheld wholly or in part.—Rep.*)

*New Trade-named Remedies and Technical Products—Composition, Uses, etc.*—Dr. J. Altschul, supplementary to previous list in "Pharm. Centralhalle" (vols. 33 and 34), has compiled the following alphabetically arranged list of new trade-named remedies and technical products which have come to his notice since then. The list embraces about 200 names, but this must not be interpreted to signify so many new preparations, such being in reality represented only in a moderate proportion. The list gives in brevity a description of the composition and uses, so far as is known, of these articles, and embraces: 54 *antiseptics* and *astringents*; 12 *iodine* and *sulphur preparations*, 20 *antipyretics* and *antineuralgics*, 23 *stomachics*, *diuretics*, *nutrient* and *iron preparations*; 23 *alkaloids*, *anæsthetics* and *hypnotics*; 14 *antitoxins* and *organotherapeutics*; and 55 *ointment bases*, *specialties* and *technical products*. The convenience of this list for reference and information entitles it to the space required for its complete embodiment in this report, as follows:

*Abrastol*—Calcium salt of  $\beta$  naphthol ether- $\alpha$ -monosulfonic acid = *Asaprol*.

*Acetol*—Ethylidene diethyl ether. Hypnotic.

*Acidum cresotinicum*—Homologue of salicylic acid prepared from cresol sodium and carbonic acid.

*Acidum cresylicum* (meta) = m-cresol.

*Acidum guaiacolo-carbonicum*—Guaiacol carbonic acid; must not be confounded with guaiacolum carbonicum.

*Acidum sozolicum* = Aseptol, a 33 per cent. solution of o-phenolsulfonic acid.

*Acidum sphacelinicum*—A constituent of ergot.

*Adonidin*—Glucoside from *Adonis vernalis*—A substitute for digitalis.

*Æthoxycaffeine*—From monobrom caffeine by the action of potassium hydrate solution. Antineuralgic.

*Airol*—Bismuth iodogallate. Iodoform substitute.

*Alanthol essence*—Contains the active constituents of *Inula helenium*. Antiphthisic.

*Alkasal*—Aluminium-potassium salicylate.

*Amidol*—Diamidophenol chlorhydrate. Photographic developer.

*Aminol*—Watery fluid containing calcium hydrate and trimethylamine.

*Amylen* = Pental = Trimethylethylene.

*Anæsthyll*—A mixture of 5 parts ethyl chloride and 1 part methyl chloride.

*Anodin*—Eye-anæsthetic of unknown composition.

*Anthion*—Potassium persulphate, for photographic purposes.

*Antibenzinpyrin*—Solution of magnesium soap in a mixture of benzin and mineral oil. Used to prevent the electric excitement of benzin.

*Anticancrin*—Erysipelas serum.

*Anticholerin*—Prepared by Hueppe.

*Antinosin*—Sodium salt of nosophen.

*Antiptisin*—Purified Tuberculin = Tuberculocidin.

*Amygdophenin*—Amygdalic acid phenetidin. Anti-neuralgic.

*Antipionin*—A sodium polyborate.

*Antirheumatin*—A mixture of methylene blue and sodium salicylate. Antirheumatic.

*Antiseptin*—A mixture of zinc iodide, zinc sulphate, boric acid and thymol.

*Antistreptococcin*—An antidote to erysipelas, obtained by Marmoreck in a manner similar to that of obtaining antitoxin.

*Antitetraizin*—A quinine derivative.

*Apolysin*—Monophenetidin citric acid.

*Agnolin*—Mixture of albumin solution with soap and fats. Used technically.

*Argentamin*—Solution of ethylenediamine silver phosphate. Anti-gonorrhœic.

*Argonin*—Alkaline silver compound of casein. A substitute for silver nitrate.

*Benzacetin*—Acetamidomethylsalicylic acid. Antineuralgic.

*Benzanilid*—A benzoyl compound of aniline, analagous to acetanilid.

*Bismuthol*—Apparently a mixture of soluble bismuth phosphate with sodium salicylate.

*Bismuthum phosphoricum solubile* is obtained by melting bismuth oxide with phosphoric acid and soda, and powdering the melt.

*Boldol*—Fractioned product of distillation from boldo oil. Antigonorrhœic and hepatic.

*Boral*—Aluminium borotartrate. Astringent.

*Bordelaise Broth*—Prepared by mixing aqueous solutions of copper sulphate (8 : 100) and burnt lime (1 : 2). Used for the destruction of parasites.

*Borosal*—Aqueous solution of boric acid, salicylic acid, and aluminium tartrate.

*Brassicon*—A green-colored mixture composed of 2 Gm. oil of peppermint, 6 Gm. camphor, 4 Gm. ether, 12 Gm. alcohol, 6 drops mustard oil. Headache remedy.

*Bromalin*—Hexamethylene tetraminbromethylate. A substitute for alkali bromides.

*Bromidia*—Hypnotic (needs no definition in this country. Rep.)

*Bromaphтарin*—A mixture of ferric oxide, calcium oxide, calcium carbonate, sodium sulphate, and sand colored with a yellow coloring-matter soluble in alcohol.

*Butyromel (Butyromeil)*—A French preparation proposed as a substitute for cod liver oil, and composed of 2 p. fresh butter and 1 p. honey.

*Byrolin*—Contains lanolin, glycerin and boric acid.

*Carniferrin*—Iron compound of phospho-carnic acid, prepared from meat extract.

*Cascara Sagrada*—(Needs no definition, Rep.).

*Celloidin*—Concentrated gelatinous collodion for preparing collodion.

*Ceral*—A wax-paste.

*Chinosol*—(?)

*Chloralimid*—Obtained by heating chloral ammonium to 100°—Hypnotic.

*Chlorodyne*—(Needs no definition, Rep.).

*Chlorolin*—A liquid antiseptic, containing monochlor- and trichlorphenol.

*Chloriodolipol*—A chlorine substitution product of phenol, creosote, and guaiacol.



*Chlorsalol*—Salicylic acid ester of chlorphenol.

*Chroatol*—Terpiniodhydrate. Used externally for boils.

*Citrophen*—A compound analagous to phenacetin, of 3 mol. phenetidin and 1 mol. citric acid.

*Cocapyrin*—A mixture of 100 antipyrine and 1 cocaine in form of pills.

*Coffeinchloral*—A compound of caffeine and chloral. Used subcutaneously for constipation.

*Cornutin*—An alkaloid from ergot.

*Coryl*—Creosote carbonate.

*Cresalol*—Salicylic acid cresyl ester.

*Crystallöse*—Saccharin-sodium in crystals.

*Cupratin*—A copper albuminate similarly prepared to ferratin.

*Cutal*—Aluminium borotannate. Astringent.

*Dermatin*—A mixture of starch, talc, etc., containing salicylic acid. Used for the skin and toilet.

*Dermol*—Represented to be bismuth-chrysophanate. The commercial article is a mixture of a bismuth salt and chrysarobin.

*Desodor*—An essence for mouth wash, apparently containing peppermint oil saturated with formaldehyde.

*Diaphtol (chinaseptol)*—O-oxychinolin-m-sulfonic acid.

*Diphthericidin*—Of unknown composition. Pastilles recommended as a preventive of diphtheria.

*Eitnerin*—Substitute for egg-yolk in tanning.

*Emulsin (!)*—Paraffin oil distilled under pressure and recommended (in France) for the preparation of emulsions.

*Enterol*—A mixture of cresols.

*Ergotininum*—Alkaloid of ergot. Hæmstatic.

*Eseridine*—Alkaloid from calabar beans (accompanying eserine, Rep.).

*Eucalyptol*—Camphor (? Rep.) of eucalyptus oil.

*Eudoxin*—Bismuth salt of nosophen. Stomachic.

*Fer crémol*—A preparation obtained from blood by means of neutral iron solution.

*Ferratin*—An iron preparation obtained :

1. Naturally, from hog's liver.
2. Artificially, by heating albumin solution with alkaline and ferric tartrate and sodium solution, and precipitating with tartaric acid.

*Ferripyrin (Ferropyrin)*—A compound of 3 mol. of antipyrine and 1 mol. of ferric chloride.

*Ferrosin*—A compound of ferric oxide, lime and albumin. Used for coloring and "weighting" purposes.

*Formanilid*—The anilid of formic acid. Homologue of acetanilid.

*Formol*—Aqueous 40 per cent. solution of formaldehyde.

*Gaduol*—Morrhual.

*Gallacton*—A fluid obtained by the action of *Bacillus peptofaciens* upon skimmed milk, freed from unchanged albumin by boiling.

*Gallicin*—Methyl-ester of gallic acid.

*Gallinol* (Gallanol)—Anilid of gallic acid.

*Glucin*—Obtained by the action of aldehyde upon chrysoidine, and sulfoning the condensation product. A sugar substitute.

*Glycerol*—Glycerin.

*Glycin*—Said to be "oxyphenylglycocol." A photographic developer.

*a-Guaiacol*—Crystallized guaiacol.

*Guaiacol Carbonate*—The carbonic acid ester of guaiacol. Recommended in tuberculosis and typhus.

*Hamalhum*—A new ferric albuminate, containing the albumin compounds and mineral salts of blood.

*Haemoferrum*—A ferric albuminate, prepared by evaporating blood previously deprived of serum, in vacuo.

*Hazeline*—Alcoholic distillate from cortex hamamelidis.

"*Heilserum*" (*Antitoxins, Rep.*)—The blood serum of horses and other animals, that are immunized against certain diseases.

*Helcosol*—Bismuth pyrogallate.

*Hypnoacetin*—Acetopheno acetyl-p-amido phenol-ether.

*Ingestol*—A stomachic remedy, containing salts, ether, alcohol and iron.

*Iodoformal*—Similar (identical, ? *Rep.*) to iodoformin.

*Iodoformin*—An odorless compound containing 75 per cent. of iodoform and, probably, hexamethylenetetramine.

*Iodoformin-Mercury*, and

*Iod-Iodoformin*, are prepared from iodoformin.

*Iodogen*—Disinfectant fumigating pastilles prepared from charcoal and potassium iodate.

*Ionon*—An isomer of "irone"—the odorous constituent of orris-nut. Has a pure violet odor.

*Isococaine*—Benzoyl compound of right rotatory ecgonine, which is produced from ordinary ecgonine by heating with potassa solution.

*Itrosyl* = Ethyl-nitrite (?).

*Izal*—A mixture of resin soap with cresolic tar oils.

*Kairolin A* = Ethyltetrahydrochinolin.

*Kairolin B* = Methyltetrahydrochinolin.

*Kaiser butter*—A mixture of levulose and butter, which emulsifies readily with water.

*Kasein (Casein) Ointment*—An emulsification of vaselin with a glycerin-watery solution of alkaline casein salts, containing some zinc oxide and benzoin.

*Katharol*—A solution of hydrogen peroxide.

*Kefyr*—Cultivated milk ferment.

*Kreosal*—A creosote-tannin compound.

*a-Kreosot*—A mixture corresponding to ordinary creosote, containing 25 per cent. of crystalline guaiacol.

*Kreosot syrup*—Creosote-magnesium in syrup.

*Kresapol*—Cresol soap.

*Kresol purum liquefactum*—Liquified ortho-cresol.

*Kresoline*—Composed of crude cresol and resin soap.

*Lactol*—Lactic acid ester of  $\beta$ -naphthol.

*Lanichol*—Purified woolfat.

*Laureol*—1. A vegetable "butter" introduced from France. 2. A disinfecting agent of unknown composition.

*Lepine*—A solution of antiseptic agents in water containing in 100 parts; mercuric chloride, 0.001; carbolic acid, salicylic acid, each 0.1; benzoic acid, calcium chloride, each 0.05; bromine, 0.01; quinine hydrobromide, 0.2; chloroform, 0.2.

*Lignosulfyn*—The mother-lye resulting in the manufacture of cellulose sulphite, and containing volatile oils and sulphurous acid.

*Liquor antihydorrhoeicus*—An alcoholic solution of chlorinated ethers. A remedy for foot-sweat.

*Lupetazin*—Dimethylpiperazin.

*Lycetol*—Tartrate of dimethylpiperazin.

*Lysidin*—Ethylene ethenyl diamine. Occurs in commerce in 50 per cent. solution and as bitartrate. A remedy for gout.

*Malton-wine*—An infusion of malt fermented with wine-yeast.

*Marrol*—A nutrient substance, said to be composed of beef-marrow, and the extracts of malt and hops.

*Medulladen*—Extract of bone-marrow.

*Moirhuol*—Alcoholic extract from cod liver oil.

*Musin*—A preparation of tamarinds.

*Mydrin*—A mixture of ephedrin and homatropine.

*Myronin*—An ointment base composed of oleum chaenoceti, potassium stearate, wax and water.

*Natrium tetraboricum neutrale*—A mixture of equal parts of borax and boric acid.

*Neurodin*—Acetyloxyphenylurethane. Antineuralgic.

*Neurosin*—A French preparation containing glycerophosphate of calcium.

*Nosophen*—Tetraiodphenolphthaleïn.

*Nutrin*—A nutrient prepared from meat.

*Nutrol*—"Artificially digested" starch, containing pepsin and hydrochloric acid.

*Odol*—Alcoholic solution of salol, saccharin, peppermint oil, and traces of other oils.

*Oenoglycose*—Represented to be very pure grape sugar; prepared in France.

*Orchidin*—An extraction of testicles prepared by Poehl's method.

*Papier Gautier*—Consists of two strips of filter paper, the one saturated with potassium iodide and iodate, the other with potassium bisulphate. When moistened, iodine is gradually developed.

*Paraform*—Polymerized formaldehyde.

*Paraldehyde*—Polymerized ethylaldehyde.

*Papoid*—The dried juice of *Carica papaya*.

*Pasta cerata*—See wax paste.

*Phenatol*—Said to contain acetanilid, caffeine, sodium bicarbonate, sulphate, carbonate, and chloride.

*Phenolein*—(?)

*Phoenixin*—Carbon tetrachloride.

*Phosferrin*—A glycerin solution of ferric chloride and phosphoric acid.

*Pinol*—Ethereal oil from *Pinus Pumilio*.

*Prostaden*—Extract of the prostate gland.

*Pumiline*—Pinol (?).

*Pyretin*—An American remedy; said to be a mixture of acetanilid, caffeine, and calcium and sodium carbonates; occasionally contains also potassium bromide.

*Resacetin*—A salt of oxy phenylacetic acid.

*β Resalgin*—B-resorcyate of antipyrine.

*Rhinalgin*—Nasal suppositories containing alumnol, menthol, and oil of valerian. Catarrh remedy.

*Rubrol*—A solution of boric acid, thymol, and of a coal derivative. Antigonorrhœic.

*Salifebrin*—Mixture of acetanilid and salicylic acid.

*Saligenin*—Product of the hydrolysis of salicin. Synthetically prepared from phenol and formaldehyde. Antipyretic.

*Salactol*—A solution of sodium salicylate and lactate in a 1 per cent. solution of hydrogen dioxide. Antidiphtheretic.

*Salazolon*—Salipyrin.

*Salicylacetol* = Salacetol.

*Salipyrasolin* = Salipyrin.

*Salithymol* = Salicylic acid thymol ester.

*Salubrin*.—An antiseptic fluid composed of 2 p. acetic acid, 25 p. acetic ether, 50 p. alcohol and 23 p. water.

*Salufer*—Sodium silicofluoride.

*Salvo Petrolia*—Vaselin.

*Sapokresol*—A mixture of crude cresols and potassa soap.

*Schwefelseife* (*Sulphur soap*)—Under Riedel's patent = thiosapol.

*Senecin*.—An elixir from *Senecia Jacobæa*.

*Septentrionalin*—Alkaloid from *Aconitum septentrionale*. A remedy for strychnine convulsions and tetanus.

*Serum paste*—Sterilized beef serum containing zinc oxide. For bandaging wounds.

*Solfinol* (*Solphinol*)—A mixture of borax, boric acid, and alkaline sulphites.

*Spasmodin* (*Sphacelotoxin*)—A preparation of ergot.

*Spinoferrin*—An iron preparation produced from spinach.

*Stypticin*—Cotarnin hydrochloride. Uterine hæmostatic.

*Sublimophenol*—A mixture of mercuric chloride and phenate.

*Tannigen*—Diacetylated tannin.

*Terpineol*—Prepared from terpinol by fractional distillation.

*Teucrin*—Extr. Scordii sterilisatum.

*Thermodin*—Acetyl-p-ethyl oxyphenolurethane. Antipyretic.

*Thioresorcin*—Sulphurated resorcin.

*Thiosinamin*—Allylsulfocarbamide. Medicinally in lupus and glandular tumors. In photography as a developer.

*Thyraden*—An extract of the thyroid gland.

*Thyreoidine*—The dried and pulverized thyroid gland of sheep.

*Traumatol*—An iodocresol obtained by the action of iodine and iodic acid upon pure or crude cresol.

*Triformol*—Paraform = polymerized formaldehyde.

*Tuberculinose*—Tuberculin purified by dialysis.

*Tussol*—Antipyrine amygdalate. For whooping cough.

*Un uentum Caseine*—See "Caseine Ointment."

*Ural (Uralin).*—Chloral urethane.

*Urotropin*—This is "hexamethylenetetramine," obtained by the reaction between formaldehyde and ammonia. Diuretic and lithontriptic.

*Vaselon*—Fatty product of distillation, dissolved in vaselin, and used as a substitute for the latter (? Rep.)

*Vernolith*—A disinfectant composed of 1 p. gas tar and 4 p. unslaked lime.

*Wax-paste*—A mixture of yellow wax, cocoanut oil, lanolin, borax, and water.—Pharm. Centralh., Dec. 26, 1895, 737-742.

*New Remedies*—Forensic determination in mixtures, etc., after Dragendorff's method. M. Lenzinger has made some experiments with the view to determine some of the modern remedies in their admixture by a course similar to that of Dragendorff for determining alkaloids, glucosides, etc. This method, as is well known, consists in shaking the *acid* aqueous solution successively with chloroform, benzol, and petroleum ether, then rendering the residual aqueous liquid alkaline with excess of ammonia, and again shaking it out with these solvents. The author's results are given as follows:

A. Out of the aqueous solution acidified with sulphuric acid the following are dissolved unchanged:

a. *In Petroleum ether.*—Guaiacol-benzoate, guaiacol-salicylate, benzo-naphthol, betol, alpol, agathin, salacetol, methylsalol, ortho-kresalol, para-kresalol, meta- and benzo-kresalol, malakin, and thermodin. Only traces of guaiacol cinnamate, and of naphthol carbonate were taken up.

b. *In Benzol.*—Salophen, pyrodin, guaiacol-cinnamate, lactophenin,  $\beta$ -naphthol carbonate, gallanol, symphorol-Na, Li, and Sr, and, after previous boiling with hydrochloric acid: neurodin, malakin, thermodin, and traces of analgen.

c. *In Chloroform.*—Pyrodin and analgen.

B. Out of ammoniacal solution the following are dissolved:

a. *In Petroleum ether.*—Phenocoll.

b. *In Benzol.*—Tolypyryrin.

c. *In Chloroform.*—Analgen.

d. *In Amyl alcohol.*—Gallanol.

Under the conditions of the above method of examination "salocol" is decomposed with formation of phenocoll, and "tolysal" into salicylic acid and methylantipyryrin.—Pharm. Centralh., Oct. 31, 1895, 629; from *Sidd. Apoth. Ztg.*

*Actol*—A Trade-name for Silver Lactate.—Credé recommends *silver lactate* under the coined name of "actol" as a powerful antiseptic. He finds it, however, somewhat irritating when applied to mucous membranes, and somewhat sensitive to light, properties which are not possessed by *silver citrate*.

*Itrol*.—This possesses all the antiseptic value of actol, is innocuous, and valuable for dressing wounds.—*Amer. Drugg.*, April 10, 1896, 215.

*Adhæsol—A Substitute for Steresol*.—Pattein recommends as a substitute for steresol a preparation, which he calls adhæsol, prepared of the following components: copal, 350 p.; benzoin, 30 p.; tolu, 30 p.; oil of thyme, 20 p.; *a*-naphthol, 3 p.; ether, 1000 p.—*Phar. Centralh.*, Aug. 1, 1895, 436.

*Airol (Oxyiodide Bismuth Gallate)—Value as a Substitute for Iodoform*.—Hægler finds that Airol, while poisonous to guinea pigs and rabbits, is without notable poisonous action upon man. Applied to wounds it is non-irritant, dries them rapidly, promotes granulation, and is in all respects fully as efficient as iodoform, for which it may be advantageously substituted. It may also be used in form of a 10 per cent. emulsion, made with water and glycerin.—*Pharm. Centralh.*, Aug. 1, 1895, 443; from *Corresp. Bl. f. Schweizer Aertzte*, 1895, 396.

*Alapurin—A New Wool Fat*.—This is marketed by a Bremen firm and is said to excel in purity, being nearly colorless, perfectly odorless, and remarkably emollient.—*Pharm. Centralh.*, June 18, 1896, 382.

*Alpha-Creasote*.—This is said to be a preparation made by mixing the usual normal constituents of creasote in such proportions that the product contains 25 per cent. of crystallized guaiacol.

*Alpha-Guaiacol* is the name applied by a French firm to crystallized synthetical guaiacol.—*Merck's Market Rep.*, July 1, 1895, 264.

*Anæsthy*, a local anæsthetic consisting of ethyl chloride, 5 p.; methyl chloride, 1 p.—by weight. Under the chapter "New Remedies," The "Chem. and Druggist" (Aug. 17, 1895, 296) calls attention to the following new remedies:

*Aminol—Composition*.—L. van Itallie has subjected this disinfecting agent to analysis and finds it to contain in one liter: calcium hydroxide, 1.52 Gm.; sodium chloride, 3.516 Gm.; trimethylamine, 0.289 Gm. It is a colorless, slightly turbid fluid, having the odor of trimethylamine, a faint alkaline reaction, and a sp. gr. of 1.01.—*Pharm. Centralh.*, Dec. 12, 1895, 711; from *Apoth. Ztg.*, 1895, 710.

*Anal—A New Remedy for Hemorrhoids, etc.*—Under the name of "anal" a new remedy for hemorrhoids, fistula, lupus, etc. is being marketed, but detailed information respecting its composition is wanting.—*Amer. Drugg.*, April 25, 1896, 245.

*Anticancerin*.—A serum introduced for the treatment of cancer and erysipelas.—*Pharm. Centralh.*, July 18, 1895, 409.

*Antidiabetin—A Compound of Manna and Saccharin*.—A French saccharin factory has introduced under the trade name "antidiabetin," a mixture of saccharin and mannit as a substitute for sugar in diabetic cases. It is introduced in three forms, which are designated respectively as 70,

10 and 1, which represent in numbers the sweetening value of the preparation as compared to that of sugar.—Pharm. Centralh., Jan. 2, 1896, 8.

*Antinonnin (Potassium Ortho-dinitro-creasolate)*—*A New Germicide*.—C. O. Hary and W. von Miller have investigated the properties of the new compound introduced under the name of "Antinonnin," and find that a solution in soap water of 1 : 1500 or 1 : 2000 is destructive to all common injurious parasites in plants, without deleterious action on the latter.—Pharm. Journ., Nov. 2, 1895, 365-366; from Muench. Allgem. Ztg., through Nature, lii, 627.

*Antispasmin—A Remedy for Whooping Cough*.—The compound "narceine-sodium salicylate," which has been introduced under the trade name "antispasmin," is recommended by Stooss as a valuable remedy in whooping cough. He employs it in form of a 2 per cent. solution, prepared as follows: antispasmin, 2 Gm.; distilled water, 900 Gm.; pectoral elixir, 98 Gm. The dose of this is one to two teaspoonfuls for children under a year old, and two to three teaspoonfuls for children up to three years old, given three or four times daily. To children over three years old he gives one to one and a half tablespoonful doses.—Pharm. Centralh., Febr. 20, 1896, 107.

*Antistreptococcin—Successful Use in the Treatment of Erysipelas*.—The name "antistreptococcin" has been given by Marmoreck to a remedy for erysipelas previously described by him, which he has since used in numerous severe cases with uniformly good results. It is stated, in fact, to be an antidote to the poison, destroying the bacillus of erysipelas—*Streptococcus*—absolutely. Its use, it is said, is not attended by unpleasant after-effects.—Pharm. Centralh., Aug. 8, 1895, 451.

*Apolisin—Characters and Uses*.—The name "apolisin" has been given to a compound of citric acid with paraphenetidin. It is an acidulous, yellowish-white, crystalline powder, soluble in 50 parts of cold and in 25 parts of hot water, readily soluble in alcohol, in glycerin, and in sulphuric or nitric acid. It melts at 70°. The new compound appears to be identical—except in melting point—with the compound described under the name of "citrophen." It is said to possess antipyretic and analgetic properties, is not poisonous, and is given in doses of 0.5 to 1.0 Gm.—Pharm. Centralh., Sept. 5, 1895, 510.

*Argonin—Characters and Bactericidal Properties*.—A. Liebrecht states that argonin, a compound obtained by treating casein-soda with silver nitrate and precipitating the solution with alcohol, possesses the same bactericidal properties as silver nitrate, without having the caustic action of the latter. Argonin is a white powder, with difficulty soluble in cold water, but easily soluble in warm water under the following precautions: It is first moistened with a small quantity of water, then heated to 90° C. on a water bath, after which the opalescent liquid is well shaken for a few



n. inutes, and finally filtered through pounded glass. In this manner a solution containing 10 per cent. may be obtained, which must be kept in the dark, and has a neutral reaction.—Pharm. Journ., Nov. 2, 1895, 365; from *Moniteur*, xlv, 1882.

*Argonine (Silver Caseinate)*—*Value in the Treatment of Gonorrhœa.*—Bender confirms the statements of previous experimenters that "argonine" affords one of the most rapid cures in the treatment of blennorrhagia. He employs it in form of a 7.5 per cent. solution in water, injecting 10 Gm. of this solution into the urethra three or four times daily. The injection should be retained if possible for about ten minutes.—Pharm. Jour., April 25, 1896, 324; from *Rev. de Thérap. Med. Chir.*, lxiii, 119.

*Borosal—A Remedy against Foot-sweat.*—Dr. A. Schneider has examined a liquid preparation which, under the name "borosal" is offered as a remedy for sweating feet. He found it to contain aluminium (determinable in the ash), potassium, sodium, sulphuric acid, boric acid, salicylic acid, and glycerin, and conjectures that it is simply an aqueous solution of alum, borax and salicylic acid, to which a little glycerin is added.—Pharm. Centralh., Sept. 26, 1895, 552.

*Borosal—Composition.*—F. Wirthgen, who is the manufacturer of "borosal," states that it is a liquid compound of boric and salicylic acid with aluminium tartrate. It contains no glycerin. The exact composition is withheld.—Pharm. Centralh., Oct. 17, 1895, 594.

*Bismal.*—The name "bismal" is given by E. Merck to the bismuth salt of methylene digallic acid, which is stated to be a useful astringent for internal administration in case of diarrhœa. The dose is from 1.5 to 4.5 grains.—Pharm. Jour., Feb. 29, 1896, 162.

*Bismuthum Phosphoricum Solubile—Composition and Use.*—According to Gehe & Co. (Report, Sept., 1895), the soluble bismuth phosphate recently introduced in the market is prepared, under a patent, by melting bismuth oxide, soda and phosphoric acid together, and pulverizing the product so obtained. It contains about 20 per cent. of bismuth oxide, and is soluble in two or three parts of water, the solutions of this concentration becoming turbid, however, after a short time. Solutions of 1 : 20 will keep clear for 24 hours or more. The compound is nearly neutral, has a faintly bitter salty taste, and is used with good effect as an antiseptic remedy in stomach and intestinal catarrhs, in dose of 0.2 to 0.5 Gm. 3 times daily. Externally it is recommended for the antiseptic treatment of wounds.—Pharm. Centralh., Sept., 1895, 523.

*Bismuth Pyrogallate*, a yellow powder containing about 60 per cent. of metallic bismuth, and used as a substitute for iodoform. It is sold also under the name of

*Helcosol*, but the preparations differ in constitution. The latter is greenish yellow in color and contains only 56.6 per cent. of metallic bismuth.

*Casein-Natrium—A New Nutrient.*—According to Röhmanns casein (sodium) natrium is a good nutrient casein derivative, 10 grams of which correspond to the albumins contained in half a liter of milk. It is described as a white, odorless, and nearly tasteless powder, which is readily soluble, and may be given in milk, cacao, or meat-broth.

*Casein-Calcium* is also said to be servicable for the same purposes.—Pharm. Centralh., Febr., 13, 1896, 92.

*Citrophen.*—A compound of citric acid and *p*-phenetidin, originated by J. Roos. It is a white powder (or crystals) having a pleasant acidulous taste, melts at 181°, is soluble in 40 p. of cold water, and readily split into its original components by acids and bases. It is given in doses of 0.5 Gm. against migraine and neuralgia, and has been used with advantage as an antipyretic in the treatment of typhus fever. It has been given in daily doses up to 6 Gm., and possesses the advantage over phenacetin and lactophenin in being far more soluble in water.—Pharm. Centralh., July 18, 1895, 409.

*Chinosol—A New Trade Named Antiseptic.*—Under the name "chinosol," a compound occurring in yellow crystals is marketed and recommended as an energetic, non-poisonous antiseptic. It is stated to be a neutral compound of "oxychinolin," the latter being split off during its application, and being in "statu nascendi," its antiseptic action is intensified, so as to be—it is claimed—forty times more energetic than carbolic acid. It may be used with equal results in the same proportions as corrosive sublimate, over which it has the advantage of being non-poisonous.—Pharm. Centralh., Jan. 23, 1896, 40.

*Chloralose—A Chloral Substitute.*—A condensation-product of chloral and glucose has recently been introduced under the name of "chloralose." It is administered as sedative and hypnotic in cases of epilepsy, mania and alcoholism, in doses of 0.2 to 1.0 Gm., according to circumstances, but its advantages over chloral hydrate do not seem to be very clear. Its influence upon the frequency of the pulse is similar to that of chloral hydrate.—Pharm. Centralh., Sept. 12, 1895; from Gehe & Co.'s Report, Sept., 1895.

*Copper-Resin—A Remedy for Fissured Hoofs.*—Liquieres recommends copper-resin for the treatment of fissured hoofs, prepared as follows: A solution of one part of cupric sulphate in 20 parts of water is made to boil, while 2 parts of resin are gradually added. The resin melts and floats upon the surface of the liquid, which should be stirred thoroughly with a glass rod for about ten minutes until the resin has acquired a green color. The latter forms, upon cooling, a brittle substance, insoluble in water, but readily soluble in alcohol. It may be used dissolved in soap liniment, or in a solution of soft soap in amyl alcohol, the following being a formula recommended by the author: Soft soap, 5 parts; amylic alco-

hol, 5 parts; copper-resin, 3 parts. A clear solution is formed, which is said to be miscible in all proportions with water.—Merck's Market Rep., Aug. 1, 1895, 308; from Pharm. Ztg., xl, 396.

*Creosote-Calcium Hydrochlorophosphate*, a white, syrupy mass, consisting of a mixture of creosote carbonate and dry calcium hydrochlorophosphate, recommended, in doses of 5 or 10 grains, as a cure for phthisis and scrofula.

*Enterol—Composition and Uses.*—Based upon the observation that the isomeric kresols, which are formed in the intestines as antagonistic products of intestinal putrefaction, occur in approximately definite proportion to each other, Foss has introduced a mixture of the three isomeric kresols from chemically pure material under the trade name "enterol." It is claimed to be non poisonous in a dilution of 0.02 to 100, and such a dilution can be given in quantities of 1 to 5 Gm. daily. It is also claimed that it acts strongly antiseptic upon the putrefactive products of the intestines.—Pharm. Centralh., Dec. 12, 1895, 711; from Wien. Med. Blätter.

*Eucaïne—A Substitute for Cocaine.*—Under the name "eucaïne" a substitute for cocaine has been introduced by the Shering Company. It is the hydrochloride of an oxypiperidine derivative, and is readily soluble in water, while the base is insoluble.—Pharm. Journ., May 2, 1896, 342; from Pharm. Ztg. xii., 260.

*Eucaïne—Advantages over Cocaine.*—Dr. Kiesel, a dental surgeon, mentions a case in which he injected  $\frac{3}{4}$  grains of cocaine, with the result that the patient was between life and death for an hour and a half. Since then he has used "eucaïne," for which he claims the advantage over cocaine that the heart is not influenced, that the anæsthesia lasts longer and is more wide-spread than with cocaine, and that the patient can tolerate an injection of 30 grains. Moreover, eucaïne is not decomposed by boiling, and is cheaper than cocaine. Eucaïne is similar in constitution to cocaine, having the empirical formula  $C_{19}H_{27}NO_4HCl$ .—Pharm. Journ., May 23, 1896, 412.

*Eucaïne—Tests of Distinction from Cocaine.*—Vulpus has made some experiments to determine tests for the distinction of eucaïne from cocaine, the hydrochlorides of the two bases resembling each other very considerably in their appearance. He has not succeeded to determine color reactions that will distinguish the one from the other, but finds a decided difference in the solubility of the two salts, cocaine hydrochloride requiring less than its own weight of water for solution, whilst eucaïne hydrochloride requires about nine times its weight. This difference in their solubilities is sufficient to determine the presence of eucaïne added to cocaine in considerable quantities, such fraudulent additions being quite possible on account of their similarity in appearance and in their action as local anaesthetics; but if the addition does not exceed 10 per cent. con-

siderably, the test is not available. In this case the difference in solubility of the free bases may be utilized. To 0.1 Gm. of the suspected cocaine hydrochloride, dissolved in 50 Cc. of water and contained in a graduated glass cylinder of wide diameter, 2 drops of solution of ammonia are added, and mixture is effected by gentle rotation. If the cocaine salt is pure, the liquid remains clear for at least a minute, and never loses its translucency even when, after violent shaking, crystals of alkaloid have separated; but if it contains 2 per cent. of eucaine hydrochloride, a strong turbidity is produced, which disappears when the total volume of the mixture is brought to 60 Cc. With large percentages of eucaine, correspondingly larger additions of water are required; so with 5 per cent. at 18° to 20°, about 20 Cc. of water have to be added to remove the turbidity produced under the above conditions.—Pharm. Centralh., May 14, 1896, 295-296.

*Eudoxin*—*Composition, etc.*—It is stated that "eudoxin," a trade-named compound recommended as a remedy for intestinal and stomach ailments, is a compound of bismuth and

*Nosophen*, or Tetraiodphenolphthalein. It is given to adults in doses of 0.2 to 0.5 Gm., to children of 5 to 10 years old, 0.1 to 0.2 Gm., and to infants in doses of 0.01 to 0.04 Gm.—Pharm. Centralh., Aug. 22, 1895, 473.

*Extractum Digitalis Liquidum Denzel*.—According to Mangold, an active, stable preparation of digitalis, representing one-fifth its weight of the leaves, and claimed to be free from injurious secondary effects.—Pharm. Centralh., Feb. 13, 1896, 92.

*Extractum Lactis*.—A concentrated preparation from milk, introduced by Marpmann, Leipzig, which is stated to contain the inorganic salts of the milk in nucleïn-like combination, and free from caseïn, albumen and sugar, 1 kilogram corresponding to 2000 liters of milk. It is said to be particularly suitable for the administration of lime.—Pharm. Centralh., Aug. 1, 1895, 436.

*Fellitin*—*A Preparation for Frost-Bites*.—Under the name of "Fellitin," a German firm has introduced a preparation which is stated to be a *natural* ox-gall soap made by a special process of manufacture. It is recommended as a remedy for frost-bites.—Pharm. Centralh., Nov. 21, 1895, 679.

*Ferrosin*.—A new specialty, recommended for purifying water, as a coloring agent, and for weighting paper, caoutchouc, etc., has been introduced under the name of "ferrosin." It is stated to be a compound of ferric oxide, lime and albumin, and is marketed in form of granules or powder of a red-brown color.—Pharm. Centralh., Oct. 3, 1895, 574.

*Ferrostyptin*—*An Antiseptic Hæmostatic*.—Under the name of "ferrostyptin," a hæmostatic compound having also antiseptic properties has been produced by Dr. A. Eichengrün. It is marketed in the form of dark-yellow crystals, or in crystalline powder, being very readily soluble in water,

forming light-brown solutions which do not stain permanently. Its solution is coagulated by heat. Ferrostyptic gauze is also supplied.—Pharm. Centralh., June 25, 1896, 390.

*Glucin—A New Sweetening Agent.*—The sodium salt of an amidotriacinsulfo acid has been introduced as a new sweetening agent under the name of "glucin." The details of the process for its preparation, which is patented, are withheld. It is said to be produced by the action of aldehydes of the aromatic and fat series upon chrysoidine, and conversion of the condensation product into their mono- and disulfo-acids. The new substance is not as sweet as saccharin, but about 100 times sweeter than that of sugar, though the sweetness is only gradually developed upon the tongue, and bears some resemblance to that of licorice. Its taste, however, is said to resemble that of sugar more nearly than does that of saccharin. Its use as a sweetening agent is said to be unaccompanied by ill-effects upon the digestion, upon the heart, or upon the kidneys, even after several weeks' use; it appears, in fact, to be devoid of abnormal action upon the different functions of the human economy.—Pharm. Centralh., Sept. 12, 1895, 524; from Gehe's Report, Sept., 1895.

*Glutol—A Compound of Formaldehyde and Gelatin.*—According to Dr. C. L. Schleich, if an aqueous solution of gelatin is evaporated to dryness in the presence of formaldehyde vapor, a new body is produced. The gelatin, by the action of the formaldehyde, loses its property to gelatinize, and an extremely stable, hard, clear, transparent substance is formed, which is not affected by dry or moist heat, nor soluble in organic or mineral acids, the alkalies, alkaline or acid salts. The formaldehyde in combination also has lost its antiseptic action, so that when reduced to fine powder it is without influence upon the development of bacteria in culture media. But its influence is quite different when it is brought in contact with wounds. Here the formaldehyde-gelatin, which is marketed under the coined name "glutol", is readily dissolved in the tissues, and very small quantities are sufficient for the complete sterilization of the wound. Glutol is odorless, non-irritant, and non-toxic. The specific directions for its preparation are to add 25 drops of solution of formaldehyde (formalin) to a solution of 500 Gm. of gelatin, and drying this in the vapor of formaldehyde. It is then powdered and preserved dry in the presence of one drop of formaldehyde solution.—Pharm. Centralh., Nov. 26, 1896, 195-196.

Dr. Vulpius has prepared some "glutol" according to the directions given by the inventor, but found difficulty to reduce the substance finally to powder, a process which may be comparatively easy by the aid of machinery, but which he found impossible of execution in a small way. By modifying the process, however, he succeeded as follows: 5 Gm. of elatin are dissolved in 20 Gm. of water, the solution before it congeals is

mixed with 2.5 Gm. of 40 per cent. formaldehyde, and allowed to stand for about 6 hours. It may then be divided by trituration so as to form a coarse, moist paste, which may be dried without danger of re adhering, and afterwards reduced to a finer powder.—*Ibid.*, April 2, 1896, 205-206.

*Glycosolool—A Trade-Named Antidiabetic.*—Lindner has introduced a new antidiabetic remedy under the name "glycosolool." Its composition is not given.—*Pharm. Centralh.*, Feb. 6, 1896, 72.

*Guaiacolethylenate—A New Patented Guaiacol Substitute.*—E. Merck calls attention to "guaiacolum aethylenatum," a new guaiacol compound prepared under a German patent. It occurs in yellowish-white needles, which melt at  $138^{\circ}$  to  $139^{\circ}$  C., are readily soluble in alcohol, and with difficulty in water. In its physiological action it resembles guaiacol, over which it possesses the advantage of being odorless and crystalline, while it has the superiority over other guaiacol compounds and derivatives in being more energetic and rapid in its action and in being borne better upon the stomach, even surpassing guaiacol carbonate in the latter respect.—*Pharm. Centralh.*, Feb. 27, 1896, 120.

*Hæmalbumin—Exhibition in form of Solution.*—Dr. M. Dahmen communicates the following formula for preparing from the so-called "hæmalbumin" a solution :

*Liquor Hæmalbumini* for convenient internal exhibition : 40 Gm. hæmalbumin are boiled for an hour under stirring with 900 Cc. water ; the solution, after replacing the evaporated water, is filtered through cotton, and after cooling is mixed with 5 per cent. of alcohol, 60 Gm. syrup, 13.3 Gm. tincture of orange peel, and 6.6 Gm. tincture of cinchona. It must be preserved in a cool place.—*Pharm. Centralh.*, Dec. 19, 1895, 731 ; from *Südd. Apoth. Ztg.*

*Hæmol Bromide—Advantages over Inorganic Bromides.*—According to Kobert hæmol bromide does not produce the disagreeable secondary effects which accompany the use of other bromine compounds. Containing a smaller proportion of bromine than do the inorganic salts, it is recommended only as a mild sedative, particularly in neuroses in which, on account of epilepsy, no good results are obtainable from the ordinary bromides. It has been used by Holst in doses of 2 Gm. daily with excellent results in hysteria and insomnia. In half this dose it produces a merely sedative effect.—*Amer. Drugg.*, May 25, 1896, 303 ; from *Centr. Bl. f. Nervenkrank.*

*Hemicranin—A Trade-Name Antipyretic.*—This is said to be a mixture of phenacetin, 5 ; caffeine, 1 ; citric acid, 1 part.—*Pharm. Centralh.*, Feb. 6, 1896, 72.

*Hypnoacetin—Composition and Uses.*—Vignolo has given the name "hypnoacetin" to the compound "acetophenonacetylparamidophenol-ether,"  $\text{CH}_3\text{CO.NH.C}_6\text{H}_4.\text{OCH}_2.\text{COC}_6\text{H}_5$ , but the process of its preparation

is not given. It occurs in the form of pearly glistening leaflets, which melt at  $160^{\circ}$  under decomposition, and are soluble in alcohol and in acetic ether. It has been named hypnoacetin, because it unites the hypnotic action of acetophenon (hypnon) with the anti-thermal effect of amido-phenol, and is given in doses of 0.2 to 0.25 Gm.—Pharm. Centralh., Aug. 22, 1895, 473.

*Iodoformin—An Odorless Substitute for Iodoform.*—Dr. A. Eichengrün has succeeded in preparing an odorless compound, which is stated to contain 75 per cent. of iodoform, but being introduced as a specialty, its exact composition is withheld. As found in the market, it is a dusty-white powder, turning yellow when exposed to light, and separating free iodoform when exposed to the action of alkalies or acids, an effect which is also said to be produced by the fluid secretions of the wounds to which it is applied in proportion to the amount of such secretion, but without the development of the unpleasant iodoform odor.—Pharm. Centralh., Aug. 8, 1895, 452.

*Iodoformin—Preparation.*—Referring to Eichengrün's new iodoform substitute, Edward Konteschweller gives the results of some experiments made with the view of determining a method for its preparation. He has obtained a body apparently identical with iodoformin, and containing 75 per cent. of iodoform, by mixing alcoholic solutions of 30 p. hexamethylenetetramin—known in commerce under the trade name "urotropin"—and of 70 p. iodoform. Instead of using alcohol, the precipitation may also be effected between the solutions of the two bodies in chloroform, in which they are much more soluble. The resulting precipitate constitutes, when dry, a white, dusty-fine and colorless powder, or possessing at most only a faint odor reminding of iodoform, and resembling in all respects the commercial iodoformin.—Ibid., Nov. 14, 1895, 651-652.

In a second paper, the author communicates the following simplified method of preparing iodoform, for which, also, he prefers the name

*Hexamethylenetetramine-Iodoform.*—26 Gm. hexamethylenetetramine are triturated with 74 Gm. iodoform and some absolute alcohol, until a dry powder is produced.—Ibid., Nov. 28, 1895, 684.

*Medicated Kefirs—Various Combinations.*—An enterprising Vienna pharmacist has now introduced "Kefir" (Koumiss prepared with Kefir? Rep.), in a variety of combinations, such as *Kreasolol Kefir*, *Guaiacol-Kefir*, *Arsenic-Kefir*, *Iodide-Kefir*. These are prepared in different strengths, indicated by numbers from 1 to 4, and particular stress is laid upon the fact that these products are not obtained by simple trituration, respectively solution, of the several medicinal agents with the kefir, but by a special process, which, however, is not given.—Pharm. Centralh., Nov. 14, 1895, 664: from Wien. Med. Presse., 1895, 1548.

*Kresochin—Composition.*—The manufacturers of the new disinfecting

agent, marketed under the name of "kresochin" state that it is composed of neutral tris cresyl sulfonate of chinolin and a loose compound of chinolin and tricresol; it contains 33 per cent. chinolin and 17 per cent. tricresol. It is recommended particularly for the disinfection of surgical instruments, and for crude disinfecting purposes is non-corrosive, and soluble in water, with exception of about 5 per cent. of its weight, forming a clear solution.—Pharm. Centralh., April 23, 1896, 247.

*Lanichol—A New Form of Wool-fat.*—Lanichol is described as a neutral and odorless wool-fat, purified by a patented process, as follows: The wool-fat is washed by means of an alkaline solution of rosin to which sufficient salt has been added to prevent the fat from dissolving. After prolonged boiling, the water is drawn off, and the fat, now free from impurities and disagreeable odor, is washed several times with a solution of salt, and finally with pure water.—Merck's Market Rep., July 1, 1895, 264.

*Lépine—A Trade-named Antiseptic Mixture.*—According to "Bull. de la Societie de Pharm. de Bruxelles" the antiseptic mixture introduced under the originator's name and known as "Lépine" has the following composition: Mercuric chloride, 0.001; carbolic acid, 0.10; salicylic acid, 0.10; benzoic acid, 0.05; calcium chloride, 0.05; bromine, 0.01; hydrobromide of quinine, 0.20; chloroform, 0.20; distilled water, 100.0.—Pharm. Centralh., Aug. 22, 1895, 473.

*Lignosulfit—A By-Product in the Preparation of Wood Pulp.*—V. Löwen then communicates some information respecting "lignosulfit," which has recently been introduced as an inhalant for the treatment of diseases of the respiratory organs, and particularly in tuberculosis. It appears to have been originally a by-product, resulting during the preparation of wood pulp for paper making, but is now specially prepared, coniferous wood being subjected for this purpose to the action of sulphurous acid, in the presence of small quantities of milk of lime, under pressure. The pulp is washed and bleached in the usual manner; the liquid portion contains the "lignosulfit," which is described as a compound of sulphurous acid with the aromatic and volatile components of the wood.—Pharm. Centralh., July 25, 1895, 423-424; from Pharm. Ztschr. Russl., 1895, 401.

*Liquor Anthracis—Composition.*—According to "Jour. de Pharm. d'Anvers" (1895, 219), the mixture known under the name of "liquor anthracis," is composed of a solution of 100 p. coal tar in 200 p. benzol and 200 p. 90 per cent. alcohol. The mixture is shaken at a temperature of 35°, until it becomes homogeneous.—Pharm. Centralh., Aug. 22, 1895, 473.

*Lyridin Bitartrate—A Non-hygroscopic Compound.*—On account of its hygroscopic character, "lyridin" has hitherto been marketed in 50 per cent. aqueous solution. It is now supplied in the form of bitartrate, a non-hygroscopic, white, crystalline powder, 10 Gm. of which are equal to about 7.2 Gm. of the 50 per cent. solution.—Pharm. Centralh., Dec. 12, 1895, 712.



*Loretin—Another Iodoform Substitute.*—Truka calls attention to a substitute for iodoform, but fails to indicate its composition, though giving formulas for oil, liniment, cerate and powder into which it enters as a prominent constituent. He extols it as superior to iodoform in some important respects.—Pharm. Centralh., Aug. 15, 1895, 466; from Wien. Med. Wochenschr.

*Noxinol—A New Trade named Photographic Agent.*—An agent recommended as an addition to photographic developers, whereby the use of a dark chamber and of a red light is partially avoided, has been introduced under the name of "noxinol". According to Valenta, it consists of the soda salt of rosolic acid. Colored developers have already been recommended, and the idea is, therefore, not new. Under the name of

*Natrol*, an agent to prevent the fading of photographs has also been introduced. It is stated to be a simple solution of 80 Gm. fused sodium acetate and 120 Gm. sodium chloride in 1 liter of water.

*Nutrol—A New Trade-named Nutrient.*—The "Pharm. Centralh" (Sept. 5, 1895, 511) mentions "nutrol" as being a recently introduced nutrient, recommended by the inventors as superior to the nutrients at present in use. It is said by them to be composed of artificially digested starch in admixture with small quantities of hydrochloric acid and meat-digesting ferments.

*Orphol.*—Trade name for "Beto-naphthol Bismuth," which see.

*Water Soluble Petroleum—Composition.*—What is termed "water soluble petroleum," now being marketed in Germany, is stated in Pharm. Ztg. to be petroleum oil mixed with a small quantity of ammonium oleate. It appears, however, to simply form an emulsion with water, which is again broken up by the decomposition of the ammonium compound when the emulsion is heated.—Amer. Drugg., April 10, 1896, 215.

*Pertussin—A Remedy for Whooping Cough.*—Under the name "pertussin" a preparation has been introduced by a Berlin apothecary, which is recommended as an innocent and certain remedy for whooping cough. Its composition is not known, except so far that it has also been designated as "Extractum Thymi Saccharatum."—Pharm. Centralh., April 16, 1896, 239.

*Phenantiptyrin—A New Trade-Named Remedy.*—Under the name of "phenantiptyrin," a remedy for typhus, rheumatism and pneumonia is being marketed. Its name would indicate that it is a mixture of phenacetin and antipyrin, but this is apparently contradicted by the description given in its advertisement: Colorless, crystalline, readily soluble in water.—Pharm. Centralh., Jan. 23, 1896, 41.

*Phenosuccin [Sodium (Natrium) Phenosuccinate].*—The preparations introduced under this name are identical with the so-called *Pyranthin* (soluble pyranthin), which see.

*Pinapin*.—*A Trade-named Preparation from Pineapples*.—This is said to be the fermented juice of pineapples, and is recommended as a remedy in catarrhal affections.—Pharm. Centralh., April 16, 1896, 239.

*Pyrantin*.—*A New Antipyretic*.—Prof. A. Piutti has given the name "pyrantin" to *p*-æthoxyphenylsuccinimid, obtained by melting the hydrochloride of *p*-amidophenetol with succinic acid, or the same acid with phenacetin. The melted mass is extracted from alcohol, from which the pyrantin crystallizes in colorless, prismatic needles, melting at 155°, sparingly soluble in cold water, insoluble in ether, but dissolved by 83.6 p. boiling water. By treatment with alkali, pyrantin forms soluble salts, the sodium compound being designated as

*Soluble Pyrantin*, which, possessing the same physiological action as pyrantin, has the advantage of ready solubility in water, so that it may be used subcutaneously. It is given in doses of 1 to 3 Gm. daily, and is capable of reducing the body-temperature from 1 to 3 degrees without unpleasant action on the heart, the respiratory organs or the digestive functions.—Pharm. Centralh., Feb. 6, 1896, 72.

*Quinosol*.—*A New Antiseptic*.—Under the name "quinosol" Kossman describes a neutral compound of *oxyquinoline*, which readily liberates that body in a nascent condition, in which it possesses very active antiseptic properties. Quinosol is readily soluble in water, has a slight, not unpleasant odor, and is entirely non-toxic. A solution of 1 : 4000 prevents the development of *staphylococcus*, and Kossman has employed it largely as a substitute for phenol and for corrosive sublimate. When used as a dusting powder it is free from irritating or caustic action. An inconvenience is the yellow stain produced by it upon linen and the hands, but this is easily removed by water.—Pharm. Journ., June 20, 1896, 484; from *Nouv Rem.* xiii., 132, after Vrtach.

*Resorcinol*.—*Preparation*.—Bielajew prepares this new compound by melting equal parts of resorcin and iodoform together at 104°–110°. The purple melt is pulverized when cool, and constitutes a red-brown, not unpleasantly odorous powder, which dissolves completely in ether, but only partially in alcohol and water. It unites the antiseptic properties of the two substances from which it is made, but is devoid of the corrosive action of the resorcin, and of the poisonous action and unpleasant odor of iodoform.—Pharm. Centralh., Nov. 14, 1894, 659; from "*Vrtach*" 1895, 825.

*Rhinalgin*.—A form of nasal suppository introduced by Thomalle as a remedy for catarrh, and prepared with alumnol, menthol, oil of valerian, and cacao butter.—Pharm. Centralh., Aug. 1, 1895, 436.

*Sanoform*.—*A Trade Named Iodoform Substitute*.—Dr. A. Arnheim calls attention to a new iodoform substitute, over which it is claimed to have certain advantages, which has been introduced in the trade under the name of sanoform. It is prepared by the action of iodine upon methyl salicylate,

and is chemically the di-iodo-methyl salicylate. It is in form of a white crystalline, inodorous powder, melting at  $110^{\circ}$  C., soluble in 10 parts of hot alcohol, readily in ether and in vaseline, and contains 62.7 per cent. of iodine.—Pharm. Journ., May 30, 1896, 421; from Pharm. Ztg., xii, 320.

*Salazalon* and *Salipyrzolin* are synonyms for *Salipyrin*.

*Salhyppone*—A Trade Name for *Benzomethyl Salicylic Ether*.—It is stated in "Amer. Drugg." (June 10, 1896), that the name "salhyppone" has been given as a trade name to "benzomethyl salicylic ester." It forms colorless crystalline needles, which melt without decomposition at  $113^{\circ}$  to  $114^{\circ}$  C., are insoluble in water, and with difficulty soluble in ether and in alcohol. It is said to be valueless as a therapeutic agent, chiefly on account of its insolubility.

*Stypticin*—A Trade-name for *Tabloids of Cotarnine Hydrochlorate*.—The "Chem. and Drugg." (June 20, 1896, 872) observes that it is somewhat curious that narcotine, one of the principal alkaloids of opium, and one of the most useless, so far as its therapeutic value is concerned, should on oxidation yield a body—Cotarnine,  $C_{12}H_{13}NO_3$ —which is of much higher physiological activity. This body, though long known chemically, has only recently been experimented with on the physiological side, with the result, amongst others, that Gottschalk has found it to be wonderfully efficacious in stopping uterine hæmorrhage. It is now marketed by an enterprising London firm in tabloid form under the name of "stypticin," the dose being  $\frac{3}{4}$  grain by the mouth, or  $\frac{1}{4}$  grain hypodermically.

*Steresol*, an antiseptic for use in diphtheria and in skin diseases. It is said to consist of equal parts of balsam of tolu and benzoin, dissolved in carbolated alcohol.

*Tannalbin*—A New Enteric Remedy.—Dr. Gottlieb has suggested a compound of tannin with albumen, which is not readily dissolved by the gastric juice, but is soluble in the intestinal canal. It is prepared by long continued heating of tannin albuminate, which has the effect of rendering that preparation highly resistant to pepsin digestion, and is described as a pale yellow tasteless powder, containing about 50 per cent. of tannin, useful in cases of acute diarrhoea and intestinal catarrh.—Pharm. Journ., May 2, 1896, 342; from D. Med. Wochensch., 1896.

*Tannoform*—A Condensation Product of *Nutgall Tannin*.—E. Merck has introduced a condensation product of nutgall tannin with formic aldehyde under the name "tannoform," the composition of which is represented by the formula  $C_{29}H_{20}O_{18}$ . It is a reddish-white, light powder, insoluble in water, but soluble in alkaline solution, and melting at  $230^{\circ}$  C. without decomposition. Constitutionally it may be regarded as

*Methylene Ditannin*.—Similar compounds obtained from other kinds of tannin are distinguished by the prefix of the source, as oakbark-, quebracho-, or rhatany-tannoform. Tannoform is reported upon favorably as a remedy

in the treatment of various forms of skin disease.—Pharm. Jour., Feb. 29, 1896, 162, from Merck's Jahresbericht, 1895.

*Tannoform—Preparation and Properties.*—E. Merck has found that the tannin of plant extractions may readily be extracted by means of formaldehyde, which forms with the tannin the compound introduced under the name of "tannoform." This may be prepared by dissolving 5 p. tannin in 15 p. hot water, adding 3 p. 30 per cent. formaldehyde, and then conc. hydrochloric acid (12 to 15 p.) so long as a precipitate is produced. This is washed with water and dried at a moderate heat. Tannoform constitutes a light, white-reddish powder, melting under decomposition at about 230° C., soluble in alcohol and in aqueous alkaline solution, but insoluble in pure water and the other solvents for organic bodies.—Pharm. Centralh., March 5, 1896, 136.

*Traumatol—A New Substitute for Iodoform.*—An iodocresol having a purple color, obtained by the action of iodine upon pure or crude cresol under certain conditions, has been introduced under the name of "traumatol" as a substitute for iodoform, over which it is said to possess the advantages of being odorless and non-poisonous, being at the same time antiseptic and non-irritant to mucous membranes. When prepared from crude cresol the iodine must be caused to act in presence of iodic acid, in order to prevent the formation of hydriodic acid, which would again decompose the iodocresol.—Pharm. Centralh., Sept. 5, 1895, 510; from Chem. Industr., 1895.

*Thiol—Successful Use in the Treatment of Burns.*—Dr. Nageotte-Wildbuschewicz, a Parisian female physician, has obtained excellent results with thiol in the treatment of burns. The wound being thoroughly cleaned, the thiol is applied upon cotton. The author has also employed ichthyol for the same purpose, but prefers the thiol because the pain engendered by its application is very slight and transient, whereas with ichthyol the pain, though also transient, is almost insufferable. Moreover thiol forms a varnish which protects the wounds and facilitates the formation of a new cuticle and the consequent healing process.—Pharm. Centralh., April 2, 1896, 214; from Therap. Wochenschr., 1895, Nos. 5 and 6.

*Trional—Similarity as Hypnotic and Sedative to Morphine.*—G. Spitzer concludes a comprehensive communication on the physiological effects of trional with the opinion that in its effects as a hypnotic and sedative it not alone approaches morphine more closely than any other medicament, but that it may virtually be used as a substitute for that alkaloid.—Pharm. Centralh., Aug. 1, 1895, 444; from Wien. Klin. Wochenschr., 1895, No. 23.

*Triphenin—A Trade-Named Homologue of Phenacetin.*—J. U. Mering describes a new antipyretic and antineuralgic under the name of "triphenin." It is a homologue of phenacetin, obtained by heating paraphenetidin with

propionic acid. It has the composition  $C_6H_4.C_2H_5O.NH.(CH_3.CH_2.CO)$ , melts at  $120^\circ C.$ , and requires 2000 p. of water for solution. It is said to reduce the temperature from  $2^\circ$  to  $3^\circ$ , when given in doses of 0.5 to 0.6 Gm.—Pharm. Centralh., Feb. 6, 1896, 73.

*Urotropin—Formation and Uses.*—By the action of ammonia and formaldehyde, the new compound "hexamethylenetetramine"  $(CH_2)_6N_4$  is formed, to which Nicolaier has given the name "urotropin." It increases the secretion of urine and liberates uric acid from its insoluble saline combinations with great promptness and efficiency. It may be given in doses up to 6 Gm. daily, the usual adult dose being 1 to 1.5 Gm. daily (given at once dissolved in water in the morning by Nicolaier), and may be detected in the urine a quarter of an hour after the administration of even smaller doses by the orange-yellow precipitate of the dibromide of hexamethylenetetramine produced on the addition of bromine water.—Pharm. Centralh., Sept. 5, 1895, 510.

*Vasogen.*—The so-called "vasogen" preparations, the method of production of which has not been made public, are in moderate demand according to Gehe & Co. (Report, Sept., 1895), the most popular combinations being creasote- and creolin-vasogen, and, to some extent, also iodoform-vasogen. Vasogen, pure and simple, is not in the market, the manufacturers declining to supply it.—Pharm. Centralh., Sept. 12, 1895, 523.

*Zymoidin—A Remedy against Gonorrhœa and Eczema.*—Rosenberg has given the name "zymoidin" to a remedy against gonorrhœa, which is said to unite the antiseptic and siccative properties of well-known antiseptics, and is stated to be composed of zinc oxide, bismuth oxide, aluminium oxide, iodine, boric acid, carbolic acid, gallic acid, salicylic acid, quinine, etc. It is employed in form of dusting powder, ointment, solution, or bougie, and it is also stated to have been used with success in eczema and similar affections.—Merck's Market Rep., Aug. 1, 1895, 309.

*Animal Remedial Agents—Origin, etc.*—E. Merck enumerates and describes quite a number of remedies prepared from the various animal organs that have lately engaged the attention of medical practitioners.

*Cerebrum exsiccatum pulv.* is prepared from calf brains (principally from the grey substance). Similar products are "cerebrin alpha" and "cerebrinin." An extract, "liquor cerebri sterilisatus," is also prepared.

*Glandula suprarenalis sicc. pulv.* is prepared from the glandular appendage of the kidneys of recently slaughtered heifers and sheep. One part of the dried glands corresponds to about five parts of the fresh organ, and it is given either in powder or in the form of tablets, each containing a dose of 0.2 Gram. Its action depends upon a contraction of the arteries, and a corresponding blood-pressure, which thus exercises a tonic effect upon the heart's action.

*Hypophysis cerebri sicc. pulv.* is prepared from the glandular appendage

of the brain (glandula pituitaria; hypophysis cerebri) of recently slaughtered heifers. It is given in form of tablets containing 0.1 Gm. of the dry substance.

*Medulla ossium rubra sicc. pulv.* is the dried red marrow of the rump-bones of heifers. Modern physiological investigation having established that the source of the blood corpuscles resides in the red marrow of bones, isopathic treatment points out the utility of this substance in anæmic conditions to incite the formation of blood. It is administered in doses of 0.2 Gm. in form of tablets.

*Ovarium siccum pulv.* is prepared from the ovaries of cows. Clinical experiments are being made. It is supplied in tablets containing 0.25 Gm. of the dried organ.

*Prostata siccata pulv.* is prepared from the prostate gland of the bull. It is intended for the treatment of hypertrophy of the prostate, and is recommended in daily doses of 5 tablets, each containing 0.1 Gm. of the dried gland.

*Renes siccati pulv.* is prepared from fresh sheep and hog kidneys by drying and pulverizing, and used for kidney affections.

*Thymus siccatus pulv.* is prepared from the fresh thymus gland of calves and sheep, and is recommended in place of the dried thyroid gland in the treatment of goitre. The dried gland is given in form of tablets containing 0.05 Gm. corresponding to 0.3 Gm. of the fresh gland; 12 to 15 tablets at least to be given daily.

*Thyreoidinum siccum*, the dried and powdered thyroid gland, is so prone to undergo putrefactive change, that it must be very carefully guarded against moisture, light and air. Experiments have therefore been made to determine and isolate its active constituents, which according to Notkin are two albuminoids, thyreoproteid and thyreoidine. The first has toxic action upon animals: the second, which is marketed under the name

*Thyreoidinum Depuratum*, is composed of at least two bodies, one of which exhibits the character of a globulin, whilst the other, physiologically the more important, is an enzyme. It is a light yellow, sticky, hygroscopic powder, of much intenser toxicity than thyreoproteid. It is easily soluble in water, and may therefore be administered subcutaneously. Its physiological action is dependent upon its power to decompose thyreoproteid, which appears to form during atrophy of the thyroid gland. Internally it is given in the form of pills made according to the following formula: Thyreoidini depurati, 0.25; kaolini, 3.0; vanillini, 0.01; mucilaginis tragacanth, q. s. ut. f. pilulæ No. xxv. Dentur ad vitrum. S.—1 to 2 pills to be taken daily.—Pharm. Centralh., Mar. 5, 1896, 134-136.

*Thyraden*—An Extract from the Thyroid Gland.—A German firm has introduced an extract of the thyroid gland under the name of "thyraden." It is prepared by a method not given, and is said to correspond to twice

its weight of the gland, the activity of which it represents. It is odorless and non-poisonous.—Pharm. Centralh., Nov. 7, 1895, 645.

*Prostaden*—*An Extract from the Prostate Gland.*—By a method analogous to that by which "thyraden" is obtained, the same firm have made an extract of the prostate gland, which they introduce into the market under the name of "prostaden." They have also prepared

*Medulladen*—*An Extract from Bone-Marrow.*—Both of these agents are recommended as physiologically active, the "prostaden" in disease of the prostate gland, the "medulladen" in cases of gout, pernicious anæmia, etc.—Ibid. Nov. 14, 1895, 659.

*Thyro-iodin*—*A Natural Component of the Thyroid Gland.*—Bauman has obtained from the thyroid gland of the sheep a product to the amount of 0.2 to 0.5 per cent. which he describes as a brown amorphous powder, readily soluble in alcohol, almost insoluble in water, and containing, when repeatedly purified, not less than 9.3 per cent. of iodine, together with phosphoric acid corresponding to 0.4 or 0.5 per cent. of phosphorus. He calls this remarkable compound "thyro-iodin," and states that chemical trials of the product, made by Dr. Roos, prove it to possess in a high degree the peculiar therapeutic activity of the gland, being almost as powerful as a corresponding quantity of the fresh gland. He has examined the human gland and finds it to contain a similar iodine-compound when in its normal condition, whereas in cases of goitre the amount of iodine appeared to be smaller. No details are given respecting the method of obtaining this product, which seems to be destined to appear in the near future as the special product of an enterprising firm of German manufacturing chemists.—Zeitschr. Physiol. Chem., xxi., 319.

*Eurythrol*—*A Remedial Product from the Spleen of Cattle.*—Under the name "eurythrol," a substance resembling meat extract has been introduced as a blood builder in anæmic conditions. It is said to be an aqueous extract of the spleen of cattle, to which some common salt is added to correct the taste, and vegetable mucilage to give it consistence. It is said to be permanent, innocuous, pleasant to the taste, and efficient, being given in doses of 1 to 2 teaspoonfuls daily in soup, bouillon or hot water.—Pharm. Centralh., June 25, 1896, 393.

*Lienaden*—*A Remedy Prepared from the Spleen.*—An extract of the spleen has been introduced under the name "lienaden," as a new remedial, which is said to be useful in hypertrophy of the spleen. It is used in conjunction with bone marrow.—Pharm. Centralh., April 16, 1896, 239; from Therap. Wochenschr., 1896, 17.

## MATERIA MEDICA.

(Including Botany and Microscopy.)

### A. VEGETABLE DRUGS.

#### GENERAL SUBJECTS.

*Drink Plants of the North American Indians.*—V. Havard considers the plants used by the Indians of North America for preparing drinks, under three heads: 1, Those yielding alcoholic drinks; 2, those yielding stimulating, exhilarating, or intoxicating principles other than alcohol; 3, those furnishing juices, or, by infusion, pleasant beverages more or less used to quench thirst.

The author contends that the American Indians north of Mexico had not acquired the knowledge of preparing alcoholic drinks at the time of the landing of Columbus. In Mexico "pulque" has been prepared from time immemorial from the Maguey (*Agave Americana*), but fermentation was unknown to the Aztecs, and the distilled liquor "mescal" from the same plants was therefore not produced until after the Conquest. From maize the Mexicans and Peruvians produced the "chica," while for several generations the Apaches of Arizona and New Mexico have prepared from the India corn the alcoholic drink called "tizwin" or "tulpi." Alcoholic beverages are also prepared from the fruit of the giant cactus (*Cereus giganteus*, Engelm.) by the Mexicans, from *Cereus Thurberi*, Engelm., in Sonora and Lower California; from the fruit of *Opuntia tuna*, Mill. and *O. Ficus-Indica*, Haw., by the Mexican Indians; from the flesh fruit of several species of *yucca*; and from the fruit of the mezquite (*Prosopis juliflora*, D. C., by the Colorado and Gila River Indians, who prepare a pleasant beverage called "atole," and by fermentation a kind of beer.

Plants yielding stimulating, exhilarating or intoxicating principles, not alcohol, are *Anhalonium Engelmannii*, Lem., a napiform tuberculous cactus, which is by the Mexicans sliced and eaten raw or added to "tizwin" to make it stronger. Closely allied to this is the *Lophophora Williamsii*, var. *Lewinii*, Coult., the tops of which are known under the name of Mescal Buttons. The Sioux Indians were formerly much addicted to the use of this plant in their religious services. The leaves and seeds of *Datura meteloides* and *D. quercifolia* and the seed of *Sophora secundifolia*, L., are likewise used as non-alcoholic intoxicants; but the most interesting plant of this class is doubtless *Ilex Vomitoria*, Ait., the "Cassine" or "Yonen" of our Southern Indians, which was used long before the advent of the white man, being prepared into intoxicant beverages by a number of methods, used in weak decoctions for the purpose of conviviality and very strong, together with other ingredients, at the religious festivals.



Plants furnishing wholesome and palatable juices are the Maples, Box Elder (*Acer Negundo*, L.), our White Walnut (*Juglans cinerea*, L.), most species of Birch (*Betula*), several species of *Cactus*, as *Agave*, *Dasylirion Texanum* and *Yucca*, the juices of which are used by the Indians to quench thirst; the long, creeping stems of the Sand-Food (*Ammobroma Sonora*, Torr.), are also used as a water substitute as well as for food, while an agreeable demulcent beverage is prepared from the mucilaginous seeds, roasted and powdered, of the Mexican "Chia," *Salvia polystachya*, Ort. Of acidulous fruits a number of species of *Rhus*, the *Manzanitas* of California, the fruits of *Shepherdia argentea*, Nutt., *S. Canadensis*, and of Barberries, are used for beverages. Aromatic teas are made from *Sassafras*, from New Jersey tea (*Ceanothus Americanus*, L.), from the Spice Bush (*Lindera Bensoin*, Blum.), from Wintergreen (*Gaultheria procumbens*), the Sweet Fern (*Myrica asplenifolia*), Sweet Golden Rod (*Solidago odora*), Marsh Tea (*Ledum palustre*, L.), *Labrador Tea* (*Ledum Grœnlandicum*, Oeder), the last two being perhaps the least acceptable, while the Erice-nilla or Chapparal Tea (the flowering tops of *Croton corymbulosus*, Engelm.), is much used in Western Texas. Other plants similarly used are: *Bidens Bigelovii*, Gray, *Salvia ballotæflora*, Benth., *Hedeoma Drummondii*, Benth., and *Actinella odorata*, Gray.—Amer. Jour. Pharm., May, 1896, 265-268; from Bull. Torrey Bot. Club, Febr., 1896.

*Medicinal Plants in the State of Washington*.—B. P. Jensen, in a paper read before the Washington Pharmaceutical Association, calls attention to the adaptability of the State of Washington for the cultivation of various medicinal plants, and mentions the following, which he has identified personally, as growing either in the wild state or cultivated:

*Uva Ursi* and Oregon Grape Root (*Berberis Aquifolia*) are very abundant and splendidly developed; Wild Cherry (*Prunus Virginiana*); Hops, (*Humulus Lupulus*), the finest in the world; Dogwood (*Cornus Florida*); Skunk Cabbage (*Symplocarpus Fœtidus*); Wormwood (*Absinthium*), this can easily be cultivated and grows profusely; Sage (*Salvia Officinalis*), all species of *Salvia* are very abundant, wild; Male Fern (*Dryopteris Filix-mas*), true male fern is not very plenty, but can be successfully cultivated; Digitalis (*Digitalis purpurea*), Lady Slipper (*Cypripedium pubescens*); Catnep (*Nepeta Cataria*), grows very profusely; Tansy (*Tanacetum Vulgare*), Pennyroyal (*Hedeoma pulegioides*), both can be cultivated very successfully; Thyme (*Thymus vulgare*); Boneset (*Eupatorium perfoliatum*); Plantain (*Plantago major*); Dandelion (*Taraxacum officinale*); Hydrastis (*Hydrastis Canadensis*); Sweet Bay (*Laurus Nobilis*); Balm Gilead (*Abies Balsamifera*); Sumach (*Rhus glabra*); Indian Lettuce or American Colombo (*Frasera officinalis*); American Saffron (*Carthamus Tinctorius*); Fire Weed (*Erechthitis Hieracifolia*); Caraway (*Carum Carvi*); Poison Oak (*Rhus Radicans*); Anise (*Pimpinella Anisum*); Soapwort (*Saponaria officinalis*); Elder (*Sam-*

*bucus Canadensis*). The author says in respect to Peppermint (*Mentha piperita*) that favorable as the salubrious climate of Western Washington is for numerous medicinal herbs, but few reach the perfection in growth and strength attained by the mints. He makes some practical suggestions respecting the cultivation of peppermint, and expresses the opinion that "mint culture" is destined to become a great industry in Western Washington. He says that proper attention, also, should be given to the cultivation of liquorice (*Glycyrrhiza glabra*), to which the climate and soil of the valleys of Western Washington are admirably suited. Other plants that do well and may be profitably cultivated are Ginseng (*Panax quinquefolium*), Lavender (*Lavendula vera*), which attains wonderful growth and quality, and Insect Flowers (*Pyrethrum Cincariaefolium*), which he finds not alone to do well, but to produce quite effective flowers. Respecting Cascara Sagrada (*Rhamnus Purshiana*), the author says that unless some legislative restriction can be enacted, by which the plant can be given some protection, it will within a few years become quite extinct.—Proceedings Washington State Pharm. Assoc., 1895, 20-43.

*Perfume Plants—Cultivation and Extraction in Australia.*—W. Lodian, with the object to place within the reach of all who are likely to be interested in the industry of perfume plants, and to enable them to practically grasp the methods, communicates a simple and non-technical description of how the work is carried on at the Australian Government Scent Farm in the cultivation of the proper plants, and the extraction of the oils by the processes of distillation, and the hot and cold processes of distillation. Some results per acre are given, and a comparison is made with the results of the industry in the Grasse district of France, which speaks very favorably for the Australian industry, particularly in the case of bitter orange blossoms and roses, the attar of the former bringing from £60 to £80 per acre, and of the latter from £70 to £90. The perfume-still is described, together with the manner of its use. Besides distilling, however, there are four other modes extracting the scents from flowers, viz., expression, maceration, absorption, and the methyl chloride process. These several processes are well described in text-books, but in the present paper they are characterized by the simplicity of the description—based upon actual experience—which renders them very intelligible to persons not acquainted with processes of this nature.

Respecting the cultivation of perfume plants the author gives a list of plants that are being cultivated at the Government Scent Farm, together with a brief description of the soil adapted, the manner of planting them, the process adopted for extraction, etc. The farm consists of about 1200 acres, but only twenty acres have been planted, gradually from cuttings in three years, under the management of Francis Mellon, these plants being the following: Anise; Sweet Fennel; Boronia; Pelargonium Radula; Jonquil; Lavender, Verd; Lavender, Spiked; Mignonette; Myrtle; Orris

Root; Pennyroyal; Peppermint; Rose of Grasse; Rosemary; Thyme, Common; Thyme of the Alps; Tuberosa; Verbena; Violets; Wall flower; Bergamotte and Seville Orange. As general pointers, the author states that the flower plots should never be too close together. If various kinds of scent plants are too near each other—as lavender here and pennyroyal next door—each one will become tainted one with the other, and the virgin aroma of each will be confused. An acre of roses or jasmine, for instance, should be separated by, say, an acre of potatoes or cabbages, etc. The plants, also, should be arranged in rows running due north and south, so as to get the greatest and longest benefit from the sunshine.—*Amer. Drugg.*, June 10 and 25, 1896, 327-328 and 356-357.

*Australian Mydriatic Drugs—Alkaloidal Constituents.*—Dr. Joseph Lanterer, of Brisbane, has been investigating the active principles of *Duboisia myoporoides* and some other Australian mydriatic plants. He finds the old leaves and twigs of *D. myoporoides* to contain hyoscyamine, while the young leaves contain scopolamine. The leaves are richest in alkaloid, containing 0.3 per cent. when the flowers commence to bud, while in winter the amount may fall to one-tenth of that quantity. The dry leaves contain 0.97 per cent. of alkaloid, and are much stronger than belladonna leaves. *Duboisia Leichardtii* is richer in alkaloid, and contains chiefly amorphous scopolamine. The leaves of *Brugmansia arborea* and of *B. Knightii*, natives of South America acclimatized in Queensland, contain less alkaloid, consisting of two-thirds hyoscyamine and one-third atropine.—*Pharm. Jour.*, Feb., 1, 1896, 83, from *Lancet*.

*Australian Poisonous Plants—Necessity of Confirmation of Toxicity by Chemical Investigation.*—J. H. Maiden calls attention to a number of Australian plants which have the popular reputation of being poisonous to stock feeding upon them, while there is no satisfactory evidence to confirm the notion. Thus *Euphorbium Drummondii* is firmly held to be poisonous to stock, but the Government veterinarian of New South Wales has experimented with it, and concludes that animals eating it are not poisoned, but die from indigestion or diseases like anthrax. Other euphorbiaceous plants that have the reputation of being poisonous but have not been investigated are: *Beyeria viscosa*, *Phyllanthus lacunarius*, F. v. M., and *Omalanthus* (*Carumbium*) *populifolius*, Grah.; and other plants are *Swansonsonia greyana*, *S. galegifolia*, *Nicotiana suaveolens*, Lehm., *Bulbine bulbosa*, Haw., *Crotolaria Mitchelli*, Benth., and species of *Gastrolobium*, *Oxylobium*, *Tephrosia*, *Macrozamia*, *Xanthorrhæa*, *Stypandra*, *Pimelia*, *Isotoma*, *Lobelia*, *Velleia*, and *Gratiola*—all suitable subjects for investigation in this connection. Again, species of *Boronia*, *Frenela* (*Callitris*), *Zygophyllum*, and the ripe fruits of *Petalostigma quadriloculare*, F. v. M., have been used as vermifuges and deserve investigation.—*Pharm. Jour.*, May 30, 1896, 424; from *Agric. Gaz.*, N. S. Wales, vi., 57.

*Japanese Economic Plants—List of those Used Medicinally by the Ainus.*

—In a paper recently contributed by the Rev. John Batchelor and Dr. Kings Miyabe, in the twenty-first volume of the "Transactions of the Asiatic Society of Japan," the authors point out that the study of the useful plants of the Ainus attracted the attention of the Japanese so long ago as the latter part of the eighteenth century, and contributions to the subject have been made from time to time since, all of which have been carefully studied by the present authors; but only those matters that have been examined and confirmed by them, with the aid of a native Ainu, have been included in the paper mentioned, so that the use of the plants referred to, as well as the identification of the plants themselves, have the double value of actual confirmation by competent writers. Forty-four plants are enumerated, their scientific and common names given, and their uses in medicine stated. The authors point out that this is not an exhaustive list of Ainu medical plants, but that the subject has only just been commenced, and that they intend steadily to pursue their studies. The plants are arranged according to the sequence of the "Genera Plantarum" of Bentham and Hooker, though the natural orders are not given. The following are the principal plants referred to, the Ainu name in all cases standing first:

*Arikko*, the bitter roots of *Thalictrum aquilegifolium*, L., used raw or roasted for pains in the stomach.

*Horap* or *Orap*, the dried root of *Paonia obovata*, Maxim. It has a bitter taste and is used for stomach-ache. The seeds are used for sore eyes.

*Opke-ni* or *Oman-kush-ni*, the bark of *Magnolia kobus*, D. C., is used for colds.

*Repnihat*, the stems of *Schizandra chinensis*, Baill., is believed to be a specific for colds. The fruit is sometimes used.

*Otompu-kina*, the stems and leaves of *Chelidonium Majus*, L., applied externally for internal pains caused by a fall or contusion.

*Riten-kina*, the stems and leaves of *Stellaria Media*, L., used externally after steeping in hot water, for bruises and bone-ache.

*Kutchi-pungara*, the sap of the climbing stem of *Actinidia arguta*, Planch., which flows freely in the spring, used as expectorant.

*Shikerebe-ni*, the inner bark of *Phellodendron amurense*, Rupr.; it has a very bitter taste, and is applied externally, softened by chewing or soaking, for the relief of internal pains. The berries are prized as an expectorant, and are also eaten as food.

*Shiu-ni* or *Yuk-raige-ni*, the bitter bark of *Picrasma allanthoides*, Planch., believed by the Ainus to be poisonous, and used to kill lice, and to remove eruptions on the scalps of children.

*Tochi-ni*, the nuts of *Aesculus turbinata*, Bl., are dried for use. The scrapings of the soaked fruit are steeped in water and used to wash wounds, the sore eyes of horses, etc.

*Oikara*, the root of *Pueraria Thunbergiana*, Benth., is used, roasted, as an external remedy for aches and bruises.

*Chikube-ni*, the bark of *Cladrastis amurensis*, Benth., var. *Buergeri*, Max., is believed to have poisonous properties, and is applied externally for internal pains.

*Kikin-ni*, the bark of *Prunus padus*, L., is used as a decoction for stomach-ache, and sometimes as a beverage in place of tea.

*Tokaomaf*, the poisonous root-stock of *Cicuta virosa*, L., is charred and used externally for pain in the bones.

*Upeu*, the herb of *Seseli bibanotis*, Koch, var. *sibirica*, D. C., is described as a useful medicine for every complaint, and as a preventive of illness. It has a very strong smell and flavor.

*Yakara-kina* or *Mo-shiu-kina*, the root-stock of *Angelica refracta*, Fr. Schm., is said to be especially valuable as tea for pains in the stomach and for diseases of the chest.

*Chima-kina*, the root-stock of *Aralia cordata*, Thunb., is used in form of decoction for washing wounds.

*Oinamat*, the leaves of *Adenocaulon adhaerescens*, Max., are applied warmed in cases of poisoning by *Rhus*.

*Noya*, the stem and leaves of *Artemisia vulgaris*, L., are boiled for inhalation to produce perspiration, and the leaves are made into a moxa.

*Kamui-noya*, *Artemisia sacrorum*, Ledeb., var. *latiloba*, Ledeb., is also largely used in medicine. It has a strong medicinal odor.

*Makayo*, the flower-shoots of *Petasites Japonica*, Mig., is used in decoction for heavy colds.

*Seta-Korokoni*, the young leaves of *Arctium lappa*, L., are applied to eruptions on the skin.

*Ikema* or *Penup*, the root of *Cynanchum caudatum*, Max., is used for a variety of purposes, the entire plant being used both as a food and a medicine, but especially as a remedy for small-pox. It is also used as an antidote to poison.

*Chiukomau*, the fruits of *Physalis alkekengi*, L., are used as poultice for pains in the hips.

*Seta-endo*, *Eschscholtzia cristata*, Willd., a highly aromatic plant, is prescribed to persons suffering from the after-effects of intoxication.

*Shumnu-hash*, the wood of *Lindera hypoclauca*, Max., is used in form of decoction for stomach-ache.

*Ketu-hash*, the roots of *Daphne chinensis*, Lam., var. *brevisflora*, are burned to charcoal, powdered, and applied to bruises or locations of internal pain, but never to cuts. The whole plant is reported poisonous, particularly the berries and roots.

*Ni-haru*, the leaves of the mistletoe, *Viscum album*, L., have a reputation as a medicine good for almost every disease, the plant being held in peculiar veneration by the Ainu. The berries are not as popular in use as the leaves.

*Kamui-tat*, the bark of *Betula ermani*, Cham., has the reputation of healing properties, and to prevent inflammation. The thin papery layers of this species of birch are sometimes pasted over wounds in place of plasters.

*Nitat-kene*, the bark of *Alnus japonica*, S. et L., is used in form of decoction for stomach-ache, and by women immediately after child-birth.

*Ura-susu*, or *Urai-susu*, the fresh bark of *Salix multinervis*, Fr. et Sav., is used shredded and softened in hot water as an application to cuts and bruises.

*Yai-ni*, or *Nup-kurun-ni*, the fresh bark of *Populus tremula*, L., is applied shredded to cut-wounds to prevent the formation of pus.

*Shungu-unkotuk*, the resin of a pine, *Picea ajanensis*, Fisch., is applied to cut-wounds to hasten healing.

*Nimak-kotuk*, the root of *Cremastra Wallichiana*, Idl., is chewed as a remedy for toothache. Sometimes a stiff paste or ointment is made of the entire orchid, and spread over swellings or boils, though rarely used for such when other remedies are at hand.

*Shuwonte*, the leaves of *Smilax herbacea*, L., are applied, softened, to heal affections of the eye, and also to eruptions and wounds.

*Etorurathip*, the root-stock of *Polygonatum giganteum*, Dietr., var. *falcatum*, Maxim, is used for laceration of the tongue and lips of children.

*Pukusa*, or *Hurarui-kina*, the entire plant, *Allium victorialis*, L, is esteemed highly as a remedy for colds.

*Surugu-kusuri*, the root-stock of *Acorus calamus*, L., is extensively used as a medicine, being esteemed as a cure for colds, headache, and pains in the stomach.

*Shiu-karush*, or *Kui-karush*, the fungus *Polyporus officinalis*, Fr., is chewed and rubbed into painful places, and also taken in decoction as a remedy for stomach-ache.—Pharm. Journ., Feb. 22, and June 6, 1896, 147-148 and 442-443.

*Formosan Drugs—Description and Identification.*—John R. Jackson contributes some notes on Formosan drugs, founded on a collection of 130 specimens of vegetable medicines procured some time since—before the recent war—from druggists' shops in Tamsui. No attempt has been made to classify them; indeed, the accuracy of the scientific names, the author says, rests in many cases on a very slender basis. The paper does not admit of much condensation, but contains much that may be conveniently referred to in this report, and is therefore given here, condensed as much as is practicable.

*Morus indica*, L.—“Sang-pai-p'i.”—The root bark, given in form of infusion with hot water in affections of the throat and lungs, blood-spitting, and in urinary obstructions.

*Lycopium sp.*—“Wan-nien-sung.”—The plant is sold as a tonic and astringent.

*Verbena officinalis*, L.—“Tie-ma-pien.”—The common name means “iron horse-whip,” in allusion to the long spike remaining after the fall of flower. An infusion of the plant is used in infant sore mouth. In China it is credited with being a blood purifier, emmenagogue, anthelmintic and antiscorbutic.

*Plantago major*, L.—“Ch'è-ch'ien-tzu.”—the seeds are used as diuretic, pectoral and demulcent tonic.

*Trillium globosum*.—“Ch'ien-li-kuang.”—the plant is reported to be valuable in affections of the eye.

*Asparagus lucidus*, Ldl.—“Fien-mên-tung.”—The fleshy tubers, when dried, are dirty brownish-yellow, two to five inches long, often perforated from having been strung up to dry. They are odorless, have little taste, and are used in chest and stomach affections.

*Dichondra repens*, Forst.—“Ma-ti-chin.”—Said to derive its common name from the resemblance of its leaf to a horse's hoof. Valued as a diuretic, and also used externally.

*Amonum* sp.—“Chin-pu-huan.”—The name means “not exchanged for gold.” The leaves are used on account of vulnerary, styptic, astrigent and discutient properties.

*Berberis Lycium* (?).—Kou-chi-kèn.—The root is used as an antifebrile antirheumatic, and tonic astrigent.

*Celoxia argenta*, L.—“Hsia-ku-ts'ao.”—A troublesome weed, eaten as a vegetable by the Chinese, said to have cooling and antiscorbutic properties, and used as an anthelmintic, vulnerary and tonic.

*Lonicera Periclymenum*.—“Jen-tung-t'eng.”—The flower stalks and leaves of the honeysuckle are valued as a discutient application to carbuncles, abscesses, swellings and sores. Internally as a drink or tincture in rheumatism, dropsy, syphilis, etc.

*Dolichos ensiformis* (more probably *D. Lablab*), L.—“Jon-ton-hua,” or “Tao-ton.”—The flowers are said to be emmenagogue; the root is used in urinary complaints; the pods are also occasionally sold as medicine.

*Filicis* sp.—“Fêng-wei-tsàs.”—The dried fronds are used against excessive flooding and other kinds of hemorrhage.

*Xanthium Strumarium*.—“Hua-esh-tzù.”—The fruit is used as a tonic, antiperiodic and diuretic. An extract of the roots and leaves, as a remedy for ulcers, cancer, carbuncles, sores and wounds.

*Taraxacum officinale*.—“Pu-kung-ying.”—The name is sometimes applied to other composite plants. Used principally topically; internally to disperse swellings. Applied to bad teeth and snake bites.

*Areca Catechu*.—“Ta-fuh-p'i.”—The fibrous husk of the areca palm is used in flatulence, dropsical and obstructive diseases of the stomach, and in the preparation of detergent ointments.

*Silene* sp.—“Pu-lin-hsing.”—The plant is said to have demulcent pro-

erties, due to saponin. The shoots and dark reddish seeds are said to be vulnerary, styptic and diuretic.

*Fibraurea tinctoria* (?)—"Fien-hsien-têng."—Identity doubtful. Used in flatulence and colic. The stems afford a yellow dye, which is said to be used with indigo to form one of the green dyes of China.

*Vitex sp.*—"Man-ching-tzù."—The globular, berry-like fruits are used in headache, catarrh, and watery eye, and are said to promote the growth of the beard.

*Melissa sp.*—"Tzu-su-tzù."—A very fragrant plant used as a warm stimulant, carminative and tonic.

*Belamcanda punctata*—"Shê-kan."—The rhizomes, dark colored externally, chrome-yellow internally, have an acrid taste when fresh, and are valued as an expectorant, deobstruent, carminative and diuretic.

*Piper Futokadsura*—"Fêng-têng."—Used for numbness of any part of the body, in arthritic affections, and in acute colic.

*Commelina*, perhaps *C. communis*—"Tan-chu."—The dry leaves are reported to have demulcent, diuretic, and lenitive properties. Used internally in fevers and dysentery; externally in piles, abscesses, bites, etc.

*Mentha arvensis*, probably?—"Po-ho."—The dried branches are considered carminative, antispasmodic, stomachic, astringent, etc.

*Aristolochia Kämpferi* (possibly, however, *Koelreuteria*)—"Ma-ton-ling."—The roots vary in size from a goose-quill to that of a man's thumb, and are said to be powerfully emetic, and are useful as an anthelmintic.

*Lilium longiflorum* and *L. candidum*—"Pai-ho."—The tubers are used in affections of the lungs, and as a tonic remedy. *L. longiflorum* grows well in North Formosa, and is apparently the only one known as a drug there.

*Cassia Tora*—"Tsao-chue-ming."—Small brown seeds—common in many parts of India—used in Formosa both externally and internally in diseases of the eye.

*Momordies cochinchinensis*—"Mu-piè-tzù."—The fine, bright crimson-red fruits, containing a number of flattish, large, brown, wrinkled seeds, are prescribed in mesenteric enlargements, bruises, swellings and ulcers.

*Tribulus terrestris*—"Chi-li."—The peculiar spring fruits are reported to have tonic properties, and to be servicable in spermatorrhœa; they are also prescribed to parturient and anæmic women.

*Scirpus capsularis*—"Fêng-hsin-ts'ao."—The plant is used as a diuretic, especially for little children. The central pith of the stalks is used to keep fistulous sores open. It is much used to prepare a menstruum for other drugs.—Chem. and Drugg., Aug. 24, 1895, 324-325.

*Phillipine Island Drugs—Chemical Examination.*—Prof. A. B. Prescott



communicates the results of the chemical examination of some drugs from the Phillipine Islands, which were made by Elgin Mallet and F. M. March in the laboratory of the University of Michigan. The value of these examinations suffers somewhat from the fact that the botanical determinations of the plants from which these drugs are derived have not been made, the drugs being superficially described under their native names, which are interpreted by the English spelling. The main object of the work so far undertaken upon the drugs, was to find whether each one contains an alkaloid or not, the details of a general method of examination for alkaloids being given; other distinctive principles, resins, acids, etc., were to be sought for when time would permit, but a few results so obtained are reported.

*Dolulugai*.—A seed of light slate color and having a very hard testa. It is nearly spherical and about half an inch in diameter. The solid kernel has a characteristic odor and a bitter taste. Dolulugai is said to be used as a native remedy for all pains in the stomach and also as a poultice in rheumatism, by mixing the powdered substance in vinegar. It was said to contain strychnine, but this is positively not so. The principal constituents are fixed and volatile oils.

*Mountain Cinnamon*.—A bark from one-fourth to one-half inch thick, of a dark-brown color and having an odor of mixed spices rather than that of cinnamon. It contains an aromatic volatile oil, tasteless resin, and a very large amount of coloring matter.

*Manugal*.—A very hard fibrous rhizome with rootlets, used by the natives as a stomachic, and as a purge by boiling thin shavings of it in cocoanut oil. It contains no alkaloids, but a considerable portion of resin.

*Vila*.—A bark of a very thick, coarse texture, used as a remedy for fevers. Nothing was found to which its medicinal properties could be ascribed.

*Macbujai*.—The plant organ to which it belongs could not be determined. Contains considerable resin and coloring matter. The drug is excessively bitter and is used as a remedy in fevers.

*Tagalaoi*.—Small branches or shoots having a bark about one-sixteenth inch thick. Contains a thick balsam-like resin. Used by boiling the inner bark in cocoanut oil, as an antiseptic application in the treatment of wounds.

*Arbutra*.—Billets of a very tough, fibrous wood, about one and a half inches in diameter and several feet in length, having a very characteristic cross section not unlike *pareira brava*. The wood beneath the bark is of a uniform yellow color. This is the only drug among those examined that contained an alkaloid, which, to judge from its yellow color, etc., is believed to be berberine, though confirmatory experiments are wanting. It is present to the amount of one-tenth of one per cent.—Reprint received from Prof. Prescott.

*Indian Drug Cultivation—Progress.*—From Mr. Lawson's report on the Government Botanical Gardens in the Nilgiris it appears that progress in the culture of medicinal plants is surprisingly slow.

*Jalap* tubers appear to be produced in sufficient quantities to supply the wants of the Madras Medical Department.

*Ipecacuanha* did not do well from the seed, but having been uprooted and replanted under light artificial shade, the plants appear to do well. A consignment of 20 lbs. has reached the London market, and its fine appearance, color, etc., are commended.

*Belladonna* is neither indigenous nor cultivated in the Nilgiri gardens.

*Acorus Calamus*, which has been introduced from Europe, is very common in swampy ground from Ootacamund. A sample of the dried root yielded very little oil to an experimenter, Surgeon-major Parker, but experiments made at the Government Gardens with fresh roots, from which a very pungent oil was obtained, seem to point out that the oil had been lost by evaporation during the drying and powdering of the roots.

*Quillaja saponaria*, introduced from South America, has done well, and yields a bark which has the characteristic appearance of the commercial soap bark. Mr. Hooper also found it to contain an equal amount of saponin when tested by Flückiger's method.—Chem. and Drugg., Jan. 25, 1896, 170.

*Drug Culture in British Central Africa.*—In a recent Foreign Office Report (No. 373), Mr. Alex. Whyte, the founder and head of the botanical gardens at Zomba, British Central Africa, gives some information respecting certain drugs which have been successfully cultivated.

*Coffee* and *tobacco* grow well and are a commercial success. *Tea* will grow, and there is great hope that *Cacao* may also do well. *Cinchona*, the best varieties, had a fair trial in the Shire Highlands, and did well, but have not been found remunerative on account of the low price of the bark. *India rubber* is expected to yield regular supplies in a few years. Some species of *Landolphia* are indigenous, and others of noted yielding power will be introduced. *Nutmegs* will be suitable for the plateau of Nyasaland, and prove remunerative. The trees take from six to eight years to come into bearing, and would form good shade and shelter for cacao. Mr. Whyte also strongly recommends planters to establish nurseries of many of the minor economic plants, such as *cardamoms*, *pepper*, *ginger*, *turmeric*, *arrow-root*, *capsicum*, etc.—Chem. & Drugg., Aug. 17, 1895, 283.

*West African Native Remedies.*—Horace W. L. Billington calls attention to a number of remedies used by the natives of Western Africa in the treatment of disease, many of them quite efficient.

*Plumbago scandens* and *P. zeylanicum*.—The roots are used for blistering and, in combination with a species of *Liliacea*, in old Calabar, for tattooing, the drugs together producing an indelible mark.

*Crossopteryx Kotryana*.—The bark of this plant, called "bembee" is a favorite febrifuge in some places. A decoction of lemon-grass.

*Andropogon Schænanthus*, is much employed for the same purpose, especially by the natives of Sierra Leone.

*Cassia* sp. (*Cassia fistula*),

*Uvaria Chama*, the leaves of a species of

*Coleus*, and of

*Iatropa Curcas*, are a few among the many purgatives that are employed. The root of a species of

*Tabernamontana*, is popularly used, in form of a decoction, as an aphrodisiac; but in parts of the Niger the *queen* of white ants, swallowed whole, is considered the most powerful aphrodisiac.

*Aspilea latifolia*, the hemorrhage plant, is used as an excellent styptic, the leaves and young shoots of this insignificant looking plant being bruised and applied to wounds. Dried *banana* leaves are likewise employed to check bleeding.—Chem. and Drugg., July 27, 1896, 120.

*Arrow Poisons*—*Review of the Different Kinds and their Sources*.—L. Lewin reviews the various arrow poisons and their sources. The

*African Arrow Poisons*, like the Asiatic, are rarely composed of a single poison, and their examination is in consequence very difficult. Many of the arrow poisons are prepared from different species of *Acokanthera*, and from two of these—*A. Deflersii* and *A. Schimperi*—the author has separated the glucoside "ouabaïn," an energetic cardiac poison. Some Nilotic tribes employ besides other substances the juice of several *Euphorbiaceæ*—*E. candelabra* and *E. venenifica*. The Kombi poison of the Lake Nyassa region is derived from the seeds of *Strophanthus Kombi*, Oliver. The Hottentots and Bushmen employ the lobes of *Hæmanthus toxicarius*, together with various *Euphorbias*, and *Acokanthera venenata*. In addition to this also underground larva of a bug, *Diamphidia simplex*, is employed, its poison being a toxalbumin. The arrow poison of the Orambos, known as "Echujá," is derived from an *Apocynacea*, *Adenium Bohemianum*, Ichiny, the poisonous constituent of which is a glucoside, "Echujin," possessing the action of a cardiac poison inferior only to "strophanthin" and ouabaïn.

*Asian Arrow Poisons* are in Nepal prepared from *Aconitum ferox*, and "aconitine" was also determined by the author in the energetic "Mishmi poison" of Upper Assam. In Sikkim the poison is derived from *Pothos decursiva*, while *Antiaris toxicaria*, *Rabelesia phillippensis*, Planchon, *Lunaria amara*, Bl., and *Pilocarpus amara*, Bl., are used for arrow poisons in other parts of India. The reputed use of *Hippomane Mancinella* (*Euphorbiaceæ*) for the preparation of arrow poison in Burmah is discredited by the author. On the continent of

*Australia*, the use of arrow poisons appears to be of rare occurrence, but it is stated that on some of the islands the arrows are poisoned by sticking them in decomposing human cadavers.

*American Arrow Poisons* are mainly prepared from several species of *Strychnos*, the result being the poison known as "Curare" or "Ourari." The arrow poison of the Cayapas Indians of Ecuador is prepared from *Solanum Cayapense*, while the Choco Indians of Columbia prepare a poison from the epiderm-glandular secretion of several toads—species of *Thyllobates*.—Pharm. Centralh., Oct. 17, 1895, 599–600; from Naturw. Rundschau., 1895, 386.

*Ipoh Arrow Poison—Source of Ingredients*.—In a former paper, Dr. Stapf had expressed the opinion that one of the plants from which the Sakaïs prepare an arrow poison, and which is known by the name of "Ipoh Aker," was closely allied to *Strychnos maingayi*. Material since received determines that the plant is not *S. maingayi*, but probably a new species of *Strychnos*, differing in that it has almost papery leaves, and in having a glabrous ovary. A second plant, known by the name of "Prual," had been determined by the author to belong to the *Rubiaceæ*. The material now received confirms this previously expressed opinion, and that the plant is *Coptosapelta flavescens*, North., a member of the *Cinchona* group. The genus *Coptosapelta*, which so far comprises only two described species, extends from the Malay Peninsula to the Philippines and New Guinea. A third plant, which has been mentioned among others as being sometimes mixed with the "Ipoh" poison by the Semangs, and which is known by the name of "Likir," has recently been sent by Mr. L. Wray, Jun., Curator of the Perak Museum, to the Calcutta Botanical Gardens for identification, and has there been ascertained to be *Amorphophallus prainii*, Hook. f.—Pharm. Journ., Aug. 31, 1895, 177; from Kew Bull., 1895, 140.

*Kyphi—A Sacred Perfume of the Ancient Egyptians*.—Professor Victor Loret, who has made an interesting study of the uses of "Kyphi" by the ancient Egyptians in their religious ceremonies, reviews three Grecian prescriptions for its preparation that have been recorded, one by Dioscorides, a second by Plutarch, and a third by Galen. The texts of these three prescriptions are not very identical, and correspond only with respect to eleven of the ingredients—honey, wine, raisins, cyperus, resin, myrrh, aspalathus, two kinds of juniper, calamus, schoenanthus. The remaining five are doubtful, and given differently in the prescriptions, but the author has taken the trouble to identify these by the aid of hieroglyphic inscriptions dating back to the period of the Ptolemies, and gives as a result a prescription for the "incense" in modern terms, as follows:

I. *Acorus Calamus*, L., 180 Gm.; *Andropogon Schoenanthus*, *Pistacia Lentiscus*, L., *Laurus Cassia*, L., of each 270 Gm.; *Laurus Cinnamomum*, Andr., 360 Gm.; *Mentha piperita*, L., *Convolvulus scoparius*, of each 270 Gm. These to be powdered finely so as to obtain  $\frac{2}{3}$  of the original weight, or 756 Gm.

II. *Juniperus phœnicia*, L., *Acacia Farneriana*, L., *Laurenia inermis*, L., *Cyperus longus*, L., of each 270 Gm.; to be triturated with 2250 Gm. wine, and infused for a day; then decanted, the product weighing 2205 Gm.

III. Raisin marmalade, 1260 Gm. and oasis wine, 1440 Gm. are then added to I and II, and allowed to macerate for five days, this making an addition of 2700 Gm.

IV. Turpentine, 1200 Gm. and honey, 3000 Gm. are then boiled together until they have lost  $\frac{1}{2}$  of their weight, and then mixed with IV and macerated 5 days, this making an addition of 3360 Gm. Finally,

V. Powdered myrrh, 1143 Gm. is added to IV. which finishes the process, and makes a total of 10,164 Gm. of *Kyphi*.—Pharm. Centralh., Jan. 30 and Febr. 6, 1896, pp. 51-53 and 69-72.

*Rhopala obovata*.—*A Fire Proof Tree*.—In a foreign office report from Bogota, Robert Thomson is quoted with respect to the *Chaparro tree*, which, he says, is not alone phenomenal in that it resists the furious fires that are persistently burning on the savanahs and hills for crops of renewed pasturage, which destroys most of the trees and brushwood of Tolima, but the fire seems to be actually congenial and subservient to its existence, for the tree, instigated by the conflagrations, forms itself into great plantations. It is indigenous to Colombia and other South American countries, attains a height of 15 to 20 feet, and its distorted trunks measure from 9 to 12 inches in diameter. It is widely distributed, and in Tolima it abounds on the slopes and ridges of the hills at elevations of from 1000 to 3500 feet. "In this department alone hundreds of square miles of the lower hills which have been reduced to sterility by incessant burnings are occupied by this diminutive tree, and it assumes the aspect of vast systematically formed, and well-kept plantations." The bark of the tree is peculiarly constituted, consisting of a congeries of integuments or semi-detached layers. The outer portion, about half an inch thick, performs no organic function, and this portion of the bark, in conjunction with its peculiar composition, is described as protecting the inner vital integuments from injury by fire.—Pharm. Jour., Oct. 12, 1895, 316.

*English Amber*.—*Distinction from Baltic Amber*.—At the meeting of the British Association, Professor Conevintz stated some interesting facts concerning the formation of amber in different parts of the world. The much-esteemed variety is Baltic amber—succinite. English amber, which is also succinite, is found mostly on the coasts of Norfolk, Suffolk and Essex, and contains insects, wood, flowers, etc., which indicate the oldest Tertiary formation. Some specimens contain fragments of magnolia and cinnamon, which makes it probable that the flora of the amber period was entirely different from that of modern Europe.—Pharm. Journ., Sept. 28, 1895, 263.

#### BOTANY AND VEGETABLE PHYSIOLOGY.

*Botanical Nomenclature*.—*Return to Earliest Specific Names*.—Geo. M. Beringer calls attention to the advanced stand taken by the Botanical Section of the Amer. Assoc. for the Advancement of Science in adopting in

*to* the rule of priority in botanical nomenclature, a rule, previously adopted that the earliest specific name is not to be retained if it is identical with the generic name, having been repealed. This repeal is to be regretted, as it has rendered possible the adoption of such barbaric specific names as *Apios Apios*, *Hepatica Hepatica*, *Benzoin Benzoin*, etc., etc., and it is significant that the views of the most progressive of the nomenclaturists are being adopted by American botanical writers, the rule being strictly followed, for instance, in such a classical work as "Sargent's *Silva of North America*." The author cites a list of some of the drug-yielding plants that will be affected by the proposed change.—*Amer. Jour. Pharm.*, Dec. 1895, 606-607.

*Herbarium Specimens—Oxalic Acid a Preservative of their Color.*—In a paper published by Nienhaus in the *Schweizer Woch. f. Chem. u. Pharm.*, he communicates his favorable experience with oxalic acid as a preservative agent of the color of petals of dried plants, which he employed in the belief that the ammonia in the air caused the fading of the color, and that it would be neutralized by the acid. He recommended that the plant should be dried between filter paper, which had previously been saturated with a 1 per cent. solution of the acid, and then dried. J. Henry Schroder, in view of some adverse criticisms and results of certain American writers, has made numerous experiments with the method, and has found not alone that the petals are well preserved by using the 1 per cent. solution as recommended by Nienhaus, but that a 3 per cent. solution employed in the same manner will preserve the color of the leaves as well. Leaves of a thin texture were well preserved with a 2 per cent. solution, but those of a thick texture required a 3 per cent. solution. Thus the leaves of *Phytolacca decandra*, of *Geranium maculatum*, and of *Baptisia tinctoria*, remained green when dried between filter paper saturated with the 3 per cent. solution, the flower petals also retaining their color unchanged. A stronger solution possesses no advantage, and in some cases was found to have unfavorable action. The author uses a heavy grey felt paper thoroughly saturated with the 3 per cent. solution and dried. Ordinarily the plant may be placed directly between sheets of this paper, but in the case of very delicate petals a very thin piece of paper was intervened to protect them from the imprints otherwise caused by the rough felt paper. The latter is changed once in twenty-four or thirty-six hours, until the plant is dry, when it is mounted in the usual way. If possible, the plants should be placed in the press at the time of collection.—*Amer. Jour. Pharm.*, March 1896, 132-134.

*Flowers—Method of Drying with Retention of Natural Form and Color.*—Prof. Pfitzer recommends the following method of drying flowers so that they may retain their natural form and color: One liter of washed, dried, and finely sifted white sand, is saturated with a solution of 3 Gm. stearin, 3 Gm. paraffin, and 3 Gm. salicylic acid, in 100 Gm. alcohol, then dried,

and sifted. The fresh plants are placed in a box, and the prepared sand is sifted carefully upon them so that all the space may be completely filled and a layer of the sand above them. The box is then allowed to stand at a temperature of  $30^{\circ}$  to  $40^{\circ}$  for a day or two, after which the sand is allowed to run out of the box.—Pharm. Centralh., Dec. 19, 1895, 736; from Zeitsch. Oest. Apoth. Ver.

*Germination of Oily Seeds—Transformation Occurring during the Process.*—According to the observations of Leclerc du Tablon, the reserve substances of oily seeds, whether they are stored up in the embryo or in the endosperm, consist chiefly of oil and aleurone; starch is but rarely found in them. In the species examined by the author the proportion of oil decreases regularly during the period of germination. By the action of a diastase the oil is transformed into fatty acids without any separation of glycerin. During germination these fatty acids, instead of accumulating, are themselves transformed into carbo-hydrates, especially into those belonging to the group of saccharoses. This saccharose is again converted, by the action of a diastase, into glucose, which is directly assimilated by the plant. Starch is also temporarily present as an intermediate product between oil and glucose. Starch and oil, as reserve substances, give rise to the same assimilable products during the germination of the seed.—Pharm. Jour., Jan. 25, 1896, 78; from Rev. Gen. de Botanique, 1895.

*Immature Seed—Influence Upon the Development of the Plant.*—Geo. M. Beringer gives a resumé of Prof. J. C. Arthur's paper (Amer. Naturalist, Sept., 1895, 804), on the deviation in development of plants due to the use of unripe seed. Professor Arthur regards *maturity* as applying to the seed as a whole, while *viability* applies to the embryo, the physiological processes associated therewith being quite distinct. He shows from personal experiments, as well as from the recorded work of others, that a considerable number of seed from unripe fruit will germinate, so that viability precedes maturity. He holds that a seed is simply a young plant, enclosed by a protective covering, and accompanied by surplus nutriment. The resting condition of a seed is not essential to germination, but is purely incidental and designed to aid in distribution. There are marked deviations from normal development in plants from immature seeds. The seedlings are weaker, the rate of germination is generally slower, and the plant is less able to withstand unfavorable conditions. There is an increase of fruits, which are smaller, but the fruit ripens earlier; and it has been pointed out by several authorities that some early market varieties of vegetables indicate that they have originated through the use of green seed.—Amer. Jour. Pharm., Dec., 1895, 608.

*Roots—Character of the Acid Excretion.*—F. Czapek has investigated the nature of the acid substances contained in the fluid excreted from the roots of a number of plants. Potassium was invariably present, magnesium

often, calcium rarely, small quantities of chloride often, phosphates invariably, and the acid reaction was due to the presence of primary potassium phosphate. Formic acid was often present in the form of potassium formate, oxalic acid only in one instance—the hyacinth. The corrosive action of the roots of plants on mineral substances is due, in all cases, to carbon dioxide. Pharm. Jour., June 27, 1896, 503; from Ber. D. Bot. Gesel., 1896, 29.

*Stomates—Dependence of their Distribution upon the Structure of the Mesophyll.*—According to L. Petit the distribution of stomates on the two surfaces of a leaf is intimately connected with the structure of the mesophyll. When the mesophyll of the two surfaces of a leaf presents a similar structure, as in different kinds of pink, the number of stomates on the two sides is the same. As the mesophyll on the upper surface increases in closeness, the number of stomates diminishes, falling to zero when the mesophyll is very compact, while that of the lower surface is full of lacunæ, as in *Pelargonium citriodorum*. The cells of the upper epiderm are then distinctly larger in the vertical direction than those of the under epiderm.—Pharm. Jour., Dec. 28, 1895, 536; from Bull. Soc. Bot. de France, 1895, 533.

*Plants—Formation of Chlorophyll and Starch.*—E. Belzung has made a very extended series of observations concerning the mode of formation of starch grains and chlorophyll bodies in plants. He concludes that the first process which takes place in the embryo is the formation of starch, the result of the activity of the protoplasm, the chlorophyll body being a secondary formation. With but few exceptions the chlorophyll pigment is diffused through the protoplasm of the young embryo. The substratum of the future chlorophyll body—leucite or plastiol—is always fully formed by the time the seed arrives at maturity; the protoplasm is always a reticulate structure; it is the protoplasm of the amyloiferous vacuoles which constitutes the chromatophore or leucite. Those starch grains which are destined to constitute the reserve food material in the ripe seed are an exception to this rule, and increase in the meshes where they are originally deposited. In proportion as the embryo becomes green and the mass of green corpuscles more abundant, the starch grains are resorbed; they form a part of the material for building up the chlorophyll bodies. The two essential phases in the life of a plant—the embryonal phase, during which the green cell is built up at the expense of materials which it has not elaborated, and the adult phase, in which its formative activity is manifested by new embryonal conditions—constitute a remarkable example of organic reversibility.—Pharm. Journ., Jan. 25, 1895, 78; from Jour. de Botanique, 1895.

*Plants—Formation and Distribution of Hydrocyanic Acid in Pangium edule.*—See *Hydrocyanic Acid* under “Inorganic Chemistry.”



*Plants—Distribution of Pectase in Plants Belonging to Widely Separated Families*—See *Pectase* under "Organic Chemistry."

*Plants—Assimilation of Silicon and Aluminum.*—According to Camusat, aluminium is taken up by plants in the form of sodium and potassium aluminates, which result from the decomposition in the soil of argillaceous substances in the presence of organic acids, thus causing the separation of silica and the formation of silicates of the alkalies and alkaline earths, which are also in part absorbed by the solvent.—Pharm. Journ., Dec. 28, 1896, 536; from Bull. Soc. d'Hist. nat. d'Autun, 1895.

*Plants—Favorable Effect of Electricity.*—Prof. A. Alvi finds that both atmospheric and terrestrial electricity exercise a favorable influence on the germination of seeds and on the growth of plants, as is shown by their quicker germination, and by yielding a greater weight of produce in the same time. He anticipates from this observation that this application of electricity will be one of the most important appliances of the future.—Pharm. Jour., Dec. 28, 1895, 536; from Bull. Soc. Bot. Italiano, 1895.

*Plants—Effect of Electric Light.*—G. Bonnier finds that a continuous electric light promotes the formation of chlorophyll in plants, and induces, at the same time, a simpler anatomical structure of the leaves. The distribution of chlorophyll in the tissues is more general than in ordinary daylight; chlorophyll corpuscles make their appearance in the cortex as far as the endoderm, and even in the medullary rays and the pith. The palisade-tissue of the leaf is reduced in amount or disappears entirely, and the epidermal cell-walls become thinner. The bark is less developed, and the various tissues of the stem are less differentiated. Alpine plants cultivated under continuous electric light exhibit characters identical with those of arctic plants which are exposed, during summer, to almost continuous daylight. On the other hand, when electric light is discontinuous—say twelve hours out of twenty-four—the effect on vegetation is intermediate between that of normal light and that of continuous daylight.—Pharm. Jour., Dec. 28, 1895, 536; from Rev. Gén. de Botanique, 1895.

*Plants—Influence of Light.*—C. Flammarion has studied the action of different rays of the solar spectrum upon sensitive plants, and finds that the growth in height of plants followed the order—red, green, white, blue, the difference being very marked in the case of the red rays. The action of red light was also most pronounced as affecting the vigor and activity of vegetation, white coming next in this case, then green, and blue again last.—Pharm. Jour., Feb. 29, 1896, 164; from Compt. rend., cxxix, 957.

*Plants—Liberation of the Perfumes by the Combined Action of Light and Water.*—Eugene Mesnard observes that it is light, and not oxygen as has been assumed, which is the principal cause of the transformation and destruction of odorous substances in plants, but in many cases these two agents seem to act in concert. The action of light makes itself felt in two

different manners : on the one hand, it acts as a chemical power, capable of furnishing energy to all the transformations through which the odorous products pass from their elaboration to their total resinification ; on the other hand, it exerts a mechanical action which plays an important part in the general life-history of plants ; and this property explains the mode of the periodical liberation of the perfumes of flowers. The intensity of the perfume of a flower depends on the equilibrium which is established at every hour of the day between the pressure of water in their cellules, which tends to drive outwards the perfumes already elaborated contained in the epidermis, and the action of light which combats this turgescence. The whole physiology of perfumed plants flows from this simple notion. It is thus explained why in the countries of the East the flowers are less odoriferous than in France ; why the trees, the fruits, even the vegetables, are sometimes filled with odoriferous products more or less resinified. It is also explained why in those countries the vegetation is thorny : the vegetation of those countries has too much light and too little water.—Chem. News, April 2, 1896, 164 ; from Compt. rend., cxxii, 493.

*Plants—Elective Absorption of Nutrients.*—Prof. W. Pfeffer has investigated the problem of the specific difference displayed by different plants in the proportion of different nutritive substances which they absorb. Selecting for his experiment the behavior of two mould-fungi, *Aspergillus niger* and *Penicillium glaucum*, to the various carbon compounds contained in artificial nutrients, he found that when two substances of different nutritive properties were presented at the same time to either of these fungi, the more nutritive one will be absorbed in preference to the other, and sometimes to the entire exclusion of the less nutritive one. Thus, when dextrose and glycerin are both presented to *Aspergillus niger*, the former being greatly in excess, the glycerin will be entirely rejected ; but if the proportion of dextrose is small, some of the glycerin will also be taken up. Glycerin may, in the same way, be partially or entirely protected from absorption by peptone, and lactic acid by dextrose.—Pharm. Journ., Nov. 2, 1895, 366 ; from Verhandl. Sächs. Ges. Leipzig, 1895, 324.

*Poisoning of Plants—Effect of Various Agents.*—F. W. Cord describes experiments which were undertaken in order to practically test the statements of physiologists that the roots of plants have little or no power of selecting their food, and can be poisoned like animals. Corn and beans, previously germinated and developed a few inches, were subjected to solutions of alcohol, corrosive sublimate, sulphuric acid, extract of aconite, arsenic and strychnine. From his results the author draws the following conclusions :

(1) Irritant poisons, such as arsenic corrosive sublimate and sulphuric acid, kill plants in water culture in a very short time, except in 0.01 per cent. solution, and in such solutions plants are less vigorous than in city water,

(2) The neurotic poisons, alcohol, aconite and strychnine, killed no plants, with the exception of the very strong solution of alcohol and one plant treated with strychnine.

(3) All the poisons used, except alcohol, affected beans more quickly and severely than corn. Alcohol, on the contrary, affected corn more than beans.

(4) The poisons produced much greater effect in water than in soil culture.

The strongest solution of aconite and strychnine used contained only one-tenth of 1 per cent.; the same strength of arsenic and corrosive sublimate killed plants very quickly.—*Amer. Journ. Pharm.*, April 1896, 218; from "Garden and Forest."

*Plants—Influence of Alkaloids on their Growth.*—A. Marcacci has carried out a series of experiments on the action of alkaloids on the growth of plants—*Lemna minor* and *Elodea canadensis*—and finds the results to vary under different conditions. While *quinine* arrests the transformation of starch into saccharose, and of dextrose into lævulose, without the action of light, *strychnine* produces the same effect only under the influence of light, while *morphine* does not completely arrest the transformation even in the presence of light. The results are not due to simple chemical processes, but are dependent on other forces not as yet fully investigated. *Pharm. Journ.*, Nov. 2, 1895, 366; from *Nouv. Giorn. Bot. Italiano*, 1895, 222.

#### MICROSCOPY.

*Microscope—Advice Concerning Its Acquisition by Pharmacists.*—A writer in the "Western Druggist" (May, 1896, 200,) gives some timely advice respecting the use and acquisition of a microscope by pharmacists this instrument being no longer to be regarded as one to gratify curiosity, but one that has become indispensable to both physicians and pharmacists that aim to keep abreast of the times. A good stand, one that will take all the modern accessories, should be purchased at the outset. It should have both a fine and a coarse adjustment, either a Universal or Investigator, meeting every requirement. A 1-inch eye piece will be found best where only one is purchased; if more are purchased, a  $1\frac{1}{4}$ -inch and a  $\frac{3}{4}$ -inch will be very handy. At first,  $\frac{2}{3}$ -inch and  $\frac{1}{3}$ -inch objective will be found sufficient, but in purchasing the  $\frac{1}{3}$ -inch objective see that its aperture is at least 0.84 N.A.; or, better, 0.92 N.A. As the student becomes more adept in working with the microscope, and wishes to branch out in bacteriology, an oil immersion objective of  $\frac{1}{10}$ - or  $\frac{1}{12}$ -inch will be found almost indispensable. A good  $\frac{1}{3}$ - or  $\frac{1}{8}$ -inch objective will show bacilli tuberculosi nicely, still, for this class of work an oil-immersion objective is to be preferred. A condenser, also, will be found invaluable in using objectives of high power. With such an outfit, a few good books, such as

Stokes' "Microscopical Practice," Gage's "Microscopical Manipulations," Clark's "Practical Microscopy," and Wetherell's "Medical Microscopy," and with intelligent study and systematic application, the student soon becomes proficient, and is prepared to meet the demands that may be made upon him professionally.

*Dissecting Microscope—Economical and Practical Construction.*—F. M. Goodman gives instruction for the construction of a dissecting microscope economically. In the selection of the lens, the expensive so-called achromatic triplet, which gives exquisite definition, may well be replaced by the ordinary tripod, which costs but a trifle, and does excellent service. This may be mounted by the student as follows: A tobacco box of the size holding six pounds of plug, about 4 by 5 and 13 inches long, with dovetailed corners, is selected. All particles of paper being carefully removed, the surface is sand-papered, varnished, and the inside blackened with a mixture of lamp-black, turpentine, and sufficient varnish to prevent its rubbing off, but to remain dull black. Laying the box on its side with the bottom towards the operator, a section about 3 inches wide is removed from the middle of what is now the top, and, cutting away sufficient from the edge of this opening, a piece of window glass, slightly larger than the opening, is let in so as to be flush with the top. To a piece of glass, or mirror if preferred, a little larger than the stage glass, a strip of heavy paper, one inch wide, is pasted along one of the wider edges so as to project half an inch. The projecting part is then pasted to the back of the box, inside, to the upper angle, thus forming a hinge so that the reflector may be raised or lowered by means of a string attached to its right hand edge by a piece of court plaster, the string passing through small wire staples driven into the edge of the box near the stage and at the extreme right hand end. When in use the open side of the box is turned towards the light and the glass reflector raised and retained at the proper angle by fastening the string. The legs of the tripod having been unscrewed and the band carrying them removed, a neat loop is made of stout wire sufficiently large to encircle the body of the lens, and the lower band is then replaced to hold the wire in place. Then, holding the lens perfectly horizontal, the wire is bent downward, at right angles, sharply, about four inches from the loop. This angle should be squared with a file. Placing the lens over the centre of the stage, a mark is made at the point where the wire touches the box—toward the right—and a hole of sufficient size is bored here for the adjusting post. This is made of two pieces of brass tubing or gas pipe so cut with fine threads that one may be screwed into the other a half or three-fourths of an inch. The outer is fastened tightly into the hole made, the inner is screwed into place, and the wire is dropped into the hole through both, resting at its angle upon the upper edge. The adjustments of the lens are made to a nicety by turning the upper piece so as to raise or

lower it. To prevent the lens arm from swinging when these adjustments are being made, a guide is made by bending a piece of the wire so as to form a long staple, which is fastened at the point shown in the cut by boring holes into the top and forcing the legs of the staple into them.—The Graduate, Sept. 1895, 7-10.

*Microscopic Examination of Crude Drugs—Arrangement Suitable for Low Power Instruments.*—John S. Wright observes that the dispensaries and works on materia medica do not commonly enter into descriptions of the minute structure of drugs. Nevertheless, the identification of drugs mainly depends upon the cellular structure revealed by the microscope, and he therefore suggests an arrangement of the drug in compact form, which shows these in a manner equally convenient for inspection with the lens or the naked eye. This arrangement consists in exhibiting opaque sections of the drug in a cell built upon an ordinary glass slip in the manner which has long been in vogue among microscopists to preserve opaque objects in convenient form for examination under the lens by reflected light. The glass slip is centered on a turn-table, which enables one to revolve it rapidly in a horizontal plane, and with a small camel's hair brush a ring of cement or varnish is laid upon the slip; in this cement a brass-ring—an ordinary curtain ring, one-half to seven-eighths inch in diameter—is placed, and when the cement has hardened, other rings are successively fastened to the top of it until the cell is of the required depth—three rings usually being sufficient. The cell is then covered with black varnish of "Brunswick Black," of which at most two coats are required. In some very shallow cells, used for leaves, it may be desirable to leave the bottom uncoated with varnish, so as to examine the markings of the object by transmitted light. A thin coat of some water soluble and quick drying cement is then applied to the bottom of the cell, the specimen is laid on, and when the cement has completely dried, the cell is closed by a thin circular cover glass having the diameter of the cell. For this purpose the slide is again centered upon the turn-table, and a neat ring of cement is laid upon the cell wall, to which the cover glass is then fastened. Thus enclosed, the drugs, if perfectly dry and free from insects, may be kept indefinitely, always in good condition, and well suited for examination with or without the aid of the lens. The author gives some special directions concerning different drugs, and a list of the instruments and materials necessary, the total cost of which, including the turn-table, need not exceed ten dollars.—Proceedings Tennessee Drugg. Assoc., 1895, 31-33.

*Preservative Solutions, etc.—New Preparations for Preserving Mosses and Green Algae for Microscopic Examination.*—J. Amaun recommends a number of solutions for the preservation of mosses and green *algæ*, which are prepared as follows:

1. *Lactophenol*.—20 Gm. of crystallized phenol, 40 Gm. of lactic acid,

s. g. 1.21; 40 Gm. of pure glycerin, s. g. 1.25, and 20 Gm. of distilled water. This preparation combines the clearing properties of phenol and that of restoring the softness and turgescence of the tissues of dried *algæ* possessed by lactic acid.

2. *Cupric Lactophenol*.—Add to 96 Gm. lactophenol, 2 Gm. crystallized copper bichloride and 2 Gm. crystallized copper binacetate. This may replace lactophenol where it is necessary to preserve the green color of the specimen, and 10 per cent. of it added to the water in which the *algæ* are found will serve as a fixing agent.

3. *Cupric Lactophenol Solution*.—Dissolve 0.2 Gm. crystallized copper bichloride and 0.2 Gm. crystallized copper binacetate in 95 Gm. distilled water, and add 5 Gm. lactophenol. This is especially good for *Desmidiæ*, *Palmeliaceæ*, and filamentous *algæ*, which do not undergo any change of form or color in it.

4. *Lactophenol Gelatin*.—Prepared from 8 Gm. white gelatin and 44 Gm. of distilled water, adding, after two hours, 38 Gm. pure glycerin, sp. gr. 1.25; then add 10 Gm. lactophenol. This is a very good substitute for Canada balsam, but must not be used for preparations colored with aniline dyes—only with those colored by hæmatoxylin or carmine.

5. *Cupric Lactophenol Gelatin*.—This is prepared like No. 4, substituting cupric lactophenol for lactophenol. In this the form and color of the chromatophores are well preserved.

6. *Lactophenol Gum*.—38 Gm. white gum arabic is washed rapidly in running water, then dissolved in 50 Gm. freshly boiled distilled water, 6 Gm. glucose and 6 Gm. lactophenol are added, well mixed and filtered. This is good for mounting rapidly all kinds of vegetable preparations, especially mosses.

7. *Styracin*.—This is prepared by dissolving 100 Gm. pure styrax in 200 Cc. chloroform, filtering, and adding the filtrate to one liter of ordinary petroleum spirit. This mixture is allowed to deposit for twenty-four hours, the clear fluid is decanted, and evaporated in the sun. A syrupy, resinous fluid is thus obtained with the index of refraction 1.60–1.64. It is specially adapted for diatoms.

8. *Biniiodide of Mercury Glycerin*.—This is obtained by dissolving mercury biniiodide in pure glycerin in the presence of potassium iodide (proportion not given). The liquid has the index of refraction = 1.80. The author finds that the best

*Cement for Preparations* made with the above media is amber or damar varnish to which 2 per cent. of boiled linseed oil has been added. —Pharm. Jour., June 27, 1896, 503; from Journ. de Botanique, June 1, 1896.

*New Embedding Material—Preparation and Uses*.—Brunotel recom-

mends a new embedding material which can be used for cutting any tissue containing water without subjecting it to the action of heat, and which is prepared as follows: Dissolve 20 parts of gelatin in 100 parts of distilled water by the aid of heat, filter through linen, and add 30 to 40 parts of glacial acetic acid and a trace of mercuric chloride. Thus prepared, the medium has the consistence of thick syrup at ordinary temperatures.

To imbed the material a small quantity is poured into a suitable mould and the object inserted in it. The whole is then immersed in alcohol, which hardens the mass of gelatin. Where alcohol cannot be used without injury to the cell contents of vegetable tissues, picric acid, potassium bichromate, or chrome alum may be employed, but these require longer to harden. The sections can be mounted, as soon as cut, in gelatin or glycerin.—Pharm. Journ., Aug. 17, 1895, 146; from Journ. de Botan.

*Permanent Mounts of Saccharomyces.*—The "National Druggist" (Dec., 1895, 369), recommends the following process for making permanent mounts of yeast and similar ferments, which has been in use by the editor for several years with good results: Place the ferment on the cover glass, and pass it through the flame exactly as in preparing bacillus tuberculosis, etc., or, if there is time, let it dry spontaneously. Float the cover glass in an alcoholic solution of hæmatoxylin (prepared as given below), with the prepared side downward, for 15 minutes, wash, dry carefully, and mount in xylol-balsam or damar. The mounts keep indefinitely. The

*Alcoholic Solution of Hæmatoxylin* for staining this mount is prepared by dissolving  $4\frac{1}{2}$  grains of hæmatoxylin in 2 drachms of absolute alcohol, adding 10 drops of a 3 per cent. solution of alum, shaking well, and filtering after allowing it to stand for three or four days in a light, warm place.

*Clearing Medium—Value of Eugenol.*—Oppermann calls attention to the value of eugenol as a clearing medium in microscopic examination of vegetable powders. By thoroughly saturating the powder with eugenol, so that it will float in this medium, the field becomes very clear when the microscopic examination is made. For difficultly penetrable powders the author recommends an ethereal solution of eugenol. It may also be used colored with aniline—green, brown, or yellow—for certain examinations, the color being abstracted by the substance, and a colored preparation in a colorless medium obtained.—Pharm. Centralh., Feb. 6, 1896, 82.

*Borax Carmine Staining Solution—Improved Formula.*—Prof. Radais observes that the ordinary aqueous solution of borax carmine widely employed in vegetable histology requires almost always the destruction of the cell contents, so that only skeleton-like preparations have been hitherto produced with this stain. He obviates this objection by the use of an alcoholic tincture prepared as follows: Powdered carmine, 2 p.; borax, 8 p.; alcohol, 70 (vol.) per cent., 200 p. The mixture is boiled for 20 minutes on a water-bath in a flask fitted with an upright condenser, is then

cooled and filtered. It is essential that the alcohol should be fully 70 per cent. by volume. The carmine solution keeps well in well-stoppered vessels.

Sections should first be macerated for a few minutes in a little 70 per cent. alcohol before being introduced into the stain, and while at least ten minutes exposure to the stain are necessary under the most favorable circumstances, sections may be left in the dye indefinitely without fear of overstaining. After withdrawing from the stain, the sections should first be washed with 70 per cent. alcohol, and dehydrated with alcohol of greater strength, and finally mounted in an anhydrous medium. The improved solution answers well for double staining, using iodine green or methylene violet for the complimentary stain.—Pharm. Journ., Oct. 26, 1895, 347; from Jour de. Pharm. (6) ii., 149.

*Rapid Method of Staining Fresh Tissues.*—Cullen describes a method by which fresh animal tissues can be stained within fifteen minutes of removal from the body. The sections cut from the frozen material are immersed in 50 per cent. aqueous formalin solution for five minutes, then in 50 per cent. alcohol for three minutes, and in absolute alcohol one minute. It is then washed in water, stained and mounted as usual.—Pharm. Jour., Aug., 17, 1895, 146; from Cent. f. allgem. Path.

*Method of Staining the Gonococcus of Neisser.*—The editor of "National Druggist" (June, 1896, 176) recommends the following method of Fraenkel as the best in his experience for staining the gonococcus of Neisser. The material is smeared on the cover glass, dried and fixed by heat in the usual way. It is then dropped into a concentrated alcoholic solution of eosin, removed, the excess of staining solution removed with blotting paper, and then dropped, without rinsing, into a concentrated solution of methylene blue in alcohol, from which it is removed after fifteen seconds, and washed with plenty of water. It may then be examined at once in glycerin, or mounted in balsam, when the microscopic field will show up the gonococci blue on a red ground, either free or grouped around the cell nuclei.

*Method of Staining the White Corpuscles of Blood.*—Toison recommends a mixture of 160 Cc. of distilled water, 30 Cc. glycerin, 8 Gm. sodium sulphate, 1 Gm. sodium chloride, and 0.025 Gm. methyl violet for coloring the white corpuscles of the blood. The red blood cells retain their appearance and form, whilst the white corpuscles are sharply distinguished by their pale violet color. The liquid has been found useful by Marschner for counting the red but not the white corpuscles.—Pharm. Centralh., Oct. 3, 1895. 574; from Prag. Med. Wochenschr., 1895.

*Method of Detecting Spermatozooids in Clothing.*—De Nobele suggests the following method for detecting spermatozooids in clothing: Scraps of the clothing are placed with the stained surface downward into a 1 per



cent. solution of sodium chloride for several hours. On removal press the scraps separately between a slip and a cover glass, dry the slips and cover and after drying plunge for a moment into a 1 per cent. solution of fuchsine. If spermatozooids are present they are readily revealed under the lens.—Nat. Drug., Dec. 1895, 368.

## BACTERIA.

*Bacteria—Biology.*—W. D. Frost contributes a paper on the biology of bacteria, in which he considers in a very lucid and concise manner their discovery, their relation to other plants (though first supposed to be animals), their structure, size, form, manner of reproduction, rapidity of reproduction, their groupings, conditions necessary to their growth, their wide distribution, relation to disease, mode of infection, and mode of action. In respect to the latter it is now the generally accepted hypothesis that the wide constitutional effects of the bacteria are due to poisons manufactured by them called toxins. Space forbids the reproduction of the paper here, and it cannot be profitably condensed. Reference must therefore be had to it in Meyer Bros. Drug., May 1896, 256–257.

*Bacteria—Cell Structure.*—H. Wagner, at the meeting of the British Association, called attention to the fact that although much is known of the connection between bacteria and disease, there is little but conjecture as to their structure, owing to the fact that even with high powers it has been difficult to obtain exact information by the aid of the microscope. Bacteria have been obtained from putrefying animal matter which were oval in shape, with a central mass which stained red, and within this a mass even more deeply stained. On the other hand those obtained from vegetable matter were distinguished by two rod-shaped masses, which took a red stain readily. The author sums up by saying that there seem to be two substances in a bacterium-cell, one corresponding to the protoplasm of an ordinary vegetable cell, whilst the other bears a resemblance to the nucleus.—Pharm. Journ., Sept. 28, 1895, 263.

In a subsequent paper the author, referring to these two substances, observes that the nuclear substance has a definite structure, which is found in principle in all bacterial cells and plays an important part in the division of the cells, but it is simpler in structure and form than the nucleus of the higher plants and animals. In the protoplast of one short bacillus examined, a central rod was distinguished, which stained deeply in fuchsine and other aniline dyes, and fairly well in hæmatoxylin. This rod was not digested by pepsin. In connection with it occurred a substance which stained but slightly. Division of the cell was found to be preceded always by division of the central rod. Other bacteria have a more complicated structure, though always referable to the above as a type. In *Spirillum nudula* numerous deeply stained bands were seen cross-

ing the cell transversely, after treatment with fuchsine. They were in close contact with the cell wall, and connected with one another by a layer of less deeply stained substance.—Pharm. Jour., Feb. 1, 1896, 85; from *Annals of Botany*, ix. 659.

*Bacteria—Modification of Gram's Method of Staining.*—Nicolle, director of the Imperial Laboratory of Bacteriology at Constantinople, says of Gram's methods of staining bacteria that although they appear simple enough, success with them is much more difficult than is generally imagined, and he has therefore undertaken to remove certain technical difficulties. Under Nicolle's modifications the following reagents are all that are necessary:

*Gentian violet, carbolated.*—10 Cc. saturated solution of gentian violet in 95° alcohol, and 100 Cc. of 1 per cent. carbolated water.

*Eosin alcoholic solution.*—50 Cc. saturated solution of eosin in 95° alcohol, and 100 Cc. of 95° alcohol.

*Fuchsine, hydro-alcoholic solution.*—5 Cc. saturated solution of fuchsine in 95° alcohol, and 100 Cc. of distilled water.

*Orth's Carmine, Alcoholic Solution.*—Add to Orth's carmine solution one-sixth its volume of 95° alcohol.

*Picrated Alcohol.*—Alcohol of 95° to which a trace of picric acid has been added—just sufficient to give it a very pale tinge of greenish yellow.

*Gram's liquid, strong.*—Iodine, 1 Gm.; potassium iodide, 2 Gm.; distilled water, 200 Gm.

*Alcohol-Acetone.*—Absolute alcohol containing one-sixth its volume of acetone.

*Alcohol-Acetone, stronger.*—Absolute alcohol containing one-third its volume of acetone.

*Xylol and Xylol-balsam.*

*Ether-Alcohol.*—A mixture of equal parts of alcohol and ether.

*Absolute Alcohol and Alcohol of 95°.*—The author's directions for "cover-glass preparations" are as follows: If a culture is to be stained, spread it on in the usual well-known way: fix with ether-alcohol, cover with carbolated violet solution, and let remain in contact from 4 to 6 seconds. Pour off the violet, and without washing or rinsing, treat with Gram's liquid from 4 to 6 seconds, renewing it, or adding a fresh drop once or twice during the operation. Bleach with the stronger alcohol acetone. Examine in water, or dry and mount in balsam. With pathological specimens more satisfactory results are obtained by double staining, which consists in simply staining with eosin after bleaching with alcohol acetone. In staining the blood of birds, beautiful results are obtained by incomplete decolorizing, using alcohol alone as a bleach, which leaves the nuclei stained a deep violet. In the case of pathological specimens con-

taining, or suspected of containing, an organism capable of "taking" Gram's stain, after carrying out the process first described, apply the hydro-alcoholic fuchsin solution instead of eosin, after bleaching with alcohol acetone. The basic fuchsin colors electively, not merely the anatomical elements but the microbe that may be present, while the acid eosin gives a diffused background.

For "staining sections" the author considers it most effective to make the section from a specimen embedded in paraffin, and fixing this to a slip with Mayer's glycerinated albumen. The method here preferred is that of triple-staining, this being the result of combining carmine with picric acid and with Gram's stain as follows: Clear the section of paraffin with xylol, and remove the latter with absolute alcohol. Put in the alcoholized Orth's carmine and leave for fifteen minutes. Remove, rinse with distilled water, and treat with carbolated gentian violet for 4 to 6 seconds, and immediately after (without rinsing) with Gram's liquid for an equal length of time, renewing the latter once or twice during the treatment. Bleach with stronger acetone-alcohol and carry rapidly through picricated alcohol. Finally, dehydrate with absolute alcohol, clear with xylol, and mount in balsam.—Nat. Drugg., Jan., 1896, 18; from *Annal. de l'Inst. Pasteur*.

*Bacteria - A New Pigment.*—Albert Thorpe observes that the chemistry of the bacterial pigments has been little investigated and communicates the following respecting a brown pigment from infusions of maize undergoing putrefaction by means of

*Bacterium brunneum.* This pigment is soluble in alcohol, and is precipitated from an alcoholic solution by the addition of water. Analysis leads to the formula  $C_{18}H_{11}O_3$ . It gives no characteristic absorption band when examined by means of the spectroscope, is soluble in alcohol, ether, and chloroform, insoluble in water and carbon disulphide, and apparently destroyed by acids.—Chem. News, Aug. 16, 1895, 82.

*Bacteria—Examination in Water, etc.*—Marpmann recommends the following plan for the determination of the presence of pathogenic ferments in the micro-organisms of water, faeces, sewer-liquids, etc. Sterilized broth is inoculated with portions of the material, and allowed to stand for twenty-four hours at  $30^{\circ}C.$ , in order to obtain more numerous specimens of the various organisms. From this mixture samples are inoculated upon acid and alkaline culture mediums, the first containing 2 per cent. of citric acid and the latter 2 per cent. of sodium carbonate. In the alkaline gelatin medium, maintained at from  $10^{\circ}$  to  $18^{\circ}C.$ , if any perturbation occur, it is due to sewer-bacteria; or similar perturbation of alkaline agar-agar kept at from  $30^{\circ}$  to  $37^{\circ}C.$ , signifies the presence of cadaveric bacteria, while the manifestation of the phenomenon in an acid gelatin medium maintained at from  $20^{\circ}$  to  $22^{\circ}$  signifies typhus bacilli. The further differentiation of

the micro-organisms is effected by plate cultures on neutral gelatin of specimens first cultivated on saccharated gelatin, and other well-known means.—Nat. Drugg., Feb. 1896, 46, from Centralbl. f. Bakteriologie.

*Tubercle Bacilli—Simplified Method of Examination.*—Professor Rindfleisch states that the tubercle bacilli are found in the greatest number in the liquid portions of the sputum, and not in the masses of mucus. To demonstrate their presence, he advises to dip a camel's-hair pencil in water, so as to moisten it well, to press out the excess of water, and then to stir the sputum well with this. On withdrawing the pencil nothing will apparently cling to it, but it will be full of bacilli if they are present in the sputum, and will be revealed under the microscope if a cover-glass is stroked lightly with the pencil, so as to make a uniform coating. The pencil cannot be cleansed so as to free it completely from bacilli, and a new one must therefore be used for each experiment.—Nat. Drugg., Feb. 1896, 46; from D. Med. Wochenschr.

*Tubercular Sputum—Method of Staining.*—Kautback and Drystale recommend the following method of staining fresh tubercular sputum: A thin layer of the sputum should be poured into a glass dish placed upon a dark background, and one of the characteristic yellowish particles picked out with a pair of fine-pointed forceps. This should then be squeezed between two clear cover-glasses, the films allowed to dry in the air, and then passed three times through the flame of a spirit-lamp. The glasses may then be floated on a warm carbol-fuchsin solution for two to five minutes, washed rapidly with water to remove excess of fuchsin, decolorized in 25 per cent. hydrochloric acid, washed with 60 to 70 per cent. spirit until no more red comes off, washed in water to remove spirit, dried between filter paper, and again passed through the flame three times. Next stain in Löffler's methylene blue for ten to twenty seconds, wash again in water, dry with filter paper and flame as before, and mount in xylol balsam. The bacilli will be stained red on a blue ground.—Nat. Drugg., Dec. 1895, 368; from Pharm. Jour.

*Microscopic Vegetation—Formation in Solutions of Quinine Valerianate.*—Barnouvin calls attention to certain vegetable growths observed by him in a saturated aqueous solution of quinine valerianate which had been standing for about a month. These vegetations presented the appearance of little greyish-white flocculent masses dispersed throughout the liquid, and under a microscope with an amplification of 590 diameters presented the following interesting appearance: The structure consisted of numerous filaments, which were nearly colorless, some of them being nicely reticulated or cloisonated, while others were continuous, and the greater part of them containing spherical or ovoid spores of a blackish hue, with sharply defined contours and apparently homogeneous contents. Here and there the mycelium tubules bore sprouts, the latter terminating in spores of

similar characteristics. Amid the filaments were numerous spores, some solitary, while others were united, two by two. They were, in fact, in the process of germination. This disposition of spores in the interior of filaments is a very remarkable phenomenon. The reproductive organs in this instance answer to the chlamydospores of the *Mucorina*, to which family the vegetations of quinine valerianate belong. The main importance of these observations is that the chlamydic form is not usually found in distilled water solutions, and the question arises, Does it occur more frequently in such solutions?—Nat. Drugg., Febr., 1896, 46; from Rep. de Pharm., Dec., 1895.

#### ALGÆ.

*Alga*—*Preservation*.—According to W. A. Setchell and W. J. V. Osterhout, the selection of aqueous media for preserving *Algæ* for class purposes is a matter requiring careful consideration. They find that no one medium can be used indiscriminately. The *Cyanophyceæ* are best preserved with a solution containing 1 per cent. each of chrome alum and formalin. Formalin alone, in  $\frac{1}{2}$  per cent. solution, preserves the cell contents well, but does not preserve the colors or the softer gelatinous sheaths and matrices. Camphor water fails with many blue-greens, and is not strong enough for species preserved in the mass and associated with many bacteria. The *Chlorophyceæ* are preserved well in any of these media, but chrome alum is preferable except in forms like *Ulva lactena*, etc., which are rendered brittle, and are best preserved in formalin solution. The *Phæophyceæ* do well in 1 per cent. formalin solution in sea water, but the larger forms are better fixed in 1 per cent. chrome alum solution for three to six hours and then preserved in 2 per cent. formalin. The coarser forms of *Rhodophyceæ* do well in either of the three media, but for finer study, specimens are best left in a concentrated solution of picric acid in sea water for twenty-four hours, then washed in plain sea water, and preserved in camphorated sea water.—Pharm. Journ., May 2, 1896, 343; from Bot. Gaz., xxi., 140.

#### FUNGI.

*Fungi*—*Action Upon Gelatin*.—C. Wehmer has made some interesting observations concerning the action of the *moulds* and *yeast fungi* upon gelatin. On producing cultures in gelatin media, the majority of the moulds have the effect of rapidly liquifying the gelatin; the peptone formed is then further decomposed, the final product in the culture being frequently handsome crystals of ammonium salts. The yeast fungi, on the other hand, produce at most faint or superficial liquefaction after weeks of contact. During the culture of moulds in gelatin media variations in their colors, as well as in the coloration of the liquefied gelatin, have been observed, which the author hopes to utilize for their identification and distinction.—Chem. Ztg., 1895, 2038.

*Mushrooms—Identity of Emulsin in Them.*—According to E. Bourguet and H. Hérissé, one and the same emulsin exists in the mushrooms, but it has not yet been demonstrated that it differs from the emulsin of almonds.—Chem. News, Dec. 6, 1895, 281; from Compt. rend., Nov. 11, 1895.

*Fungi—Number of Australian Species.*—D. McAlpine has carefully tabulated all the Australian fungi known up to the end of the year 1894, and finds that the total number of species is 2284, West Australia contributing 242, South Australia 262, Tasmania 339, Victoria 1070, New South Wales 406, Queensland 1060. The species are classified and several new species described with illustrations.—Pharm. Jour., Feb. 29, 1896, 165; from Agricult. Gaz., N. S. Wales. vi. 752.

*Ustilagineæ—Classification of Species.*—P. Herzberg has studied the development of the seven species into which *Ustilago carbo* is now divided, and classified them into two groups, according to whether they germinate from a mycelium or from a pro-mycelium, the latter being simply a form of mycelium in which there is an early production of spores. To this latter group belong *Ustilago jensenii*, *U. avenæ*, and *U. perennans*; while *U. hordei* and *U. tritici*, which produce sterile mycelia, are formed into a new genus *Ustilagidium*. In nutrient solutions all the species produce chlamydospores, which again germinate into mycelia.—Pharm. Jour., May 30, 1896, 423; from Zopps Beiträge, 1895.

In this connection it is interesting that O. Brefeld announces the discovery that the parasitic rusts on rice and on *Setaria crus-ardæ*, hitherto known as

*Ustilaginoidea oryzae* and *U. Setariæ* are in reality stages of development of an ascomycetous fungus allied to ergot. This was proved by the cultivation of the so-called resedospores in nutrient solutions, where they gave birth to an abundantly-septated mycelium, like the higher fungi, bearing minute conidia similar to those of *Pilacre*. The rust of *Setaria* produces true sclerotes, and from these sclerotes were obtained perithecia containing true asci, each ascus containing eight ascospores.—Pharm. Jour., May 30, 1896, 423; from Bot. Centralh., 1896, 97.

*Zizania latifolia—Novel Uses of a Smut produced on the Plant.*—T. Hennings describes an interesting *Ustilago* on *Zizania latifolia*. It is sold in the markets of Tonkin as a vegetable. Japanese women are said to color the eyebrows and the hair with the spores mixed with oil. These are also mixed with lac to produce rusty-colored wares.—Amer. Jour Pharm., Dec., 1895, 614; from Botanical Gazz.

*Ergot—A Valuable Variety From the Canary Islands.*—Charles Umney calls attention to a variety of ergot which has reached London from the Canary Islands. A preliminary examination shows this ergot to yield 17.28 per cent. of extractive to water, which is higher than that yielded by

the best Spanish ergot, and decidedly higher than that yielded by the Russian or Belgian article. It appears to be admirably adapted for the preparation of ergotin on account of its pale color.—Pharm. Journ., Dec. 28, 1895, 546.

*Ergot—Desirability of Extracting the Fixed Oil.*—John Ayd calls attention to the value of extracting the fixed oil—of which it contains from 25 to 35 per cent.—from ergot before using it for making the fluid extract or other preparations. The oil is readily extracted by benzine, is non-drying, and varies in color from light yellow to dark brown. The value of this treatment is also of importance in that ergot deprived of fixed oil will keep for a long time without losing its activity, as has been demonstrated by other investigators.—Proc. Maryland State Pharm. Assoc., 1895, 42-43.

*Ergot—Microscopic Detection in Flour and Bread.*—The following microscopic method for the detection of ergot in flour and bread is recommended by M. Genter: A few Mgm. of the substance are mixed with water upon the slide, a cover-glass is placed over it, and it is heated over the flame to boiling, whereby the starch cells are ruptured and the fragments of ergot become visible. The preparation is first examined under a lens of 100 to 120 diameters, and if suspicious forms are revealed, a lens of higher power (300 to 400 diameters) is employed. The ergot particles are recognized by their strong refraction (due to fat), the dark violet color of their cortical portion and the green yellow of the interior substance, as well as by the characteristically notched outlines. Comparisons with mixtures containing known quantities of ergot enable an approximate quantitative determination.—Pharm. Centralh., Dec. 5, 1895, 697; from Arch. f. Hyg. xxiv., 228.

*Ergot—Advantageous Combination with Sodium Phosphate.*—Luton recommends the combination of ergot, either in substance or in form of extract, with sodium phosphate, as uniting to the greatest advantage the therapeutic action of the two substances. He introduces this combination under the coined name

*Phosphergot*, and claims for it that it produces, particularly in the cases of women, a mild form of intoxication, similar to that of hashish, and that in small doses it relieves physical or mental depression and fatigue. Pathologically it prevents the nervous pains attending melancholia and hypochondria, and has a marked favorable influence in cases of chlorosis, marasmus, and tuberculosis. It may be administered in the following prescription:

1. Powdered sodium phosphate, powdered ergot, each 0.25. To be given in a wafer early before eating.
2. Powdered sodium phosphate, extract of ergot, each 2.0. Divide into 20 pills and direct two pills to be taken daily once or twice before eating.
3. Powdered sodium phosphate, extract of ergot, each 1.0; distilled

water 10.0. To be used once or twice daily by subcutaneous injection.—Pharm. Centralh., June 16, 1896, 31; from Un. Méd. du N. E., 1895.

*Monascus Purpureus*, n. sp.—Used in Java as a Pigment.—F. Went describes under the name of *Monascus purpureus*, n. sp. a fungus that produces the pigment known in Java as

“*Ang-guac*,” which is largely used there for coloring various articles of food. The pigment, which is imported from China, is of a deep purple color, and is located in a portion of the thallus, other portions being colorless. It can be completely extracted by chloroform, and is found to be very stable, melting at 50° C., but incapable of sublimation. It contains no nitrogen. The fungus, which belongs to the *Hemiasis* of Brefeld, has no true conoids, but produces chlamydo-spores, which are wanting in the allied genus *Thelelobus*.—Pharm. Jour., May 30, 1896, 424; from Annales d. Science Nat. Botanique, New Series, I, 1.

*Ang-khak*—A Chinese Fungoid Pigment.—According to H. C. Poinson a fungoid coloring matter, called ang-khak, is imported into Java from China, and used for giving a fine purple color to foods and beverages. It is the product of a special fungus, the first origin of which is not known; but it is propagated in the province of Quant-tung, as follows: Rice, thoroughly boiled, is spread out upon plates to cool, and when quite cold sprinkled over with ang-khak of a former preparation. The plates, with their contents, are then kept for six days in a dark, cold place. It then has a red color, which afterwards deepens. The coloring matter dissolves in alcohol with a splendid garnet-red color. It can be extracted with chloroform, and in a state of purity dissolves in methyl- and ethyl-ether, glacial acetic acid, and ethyl-acetate, sparingly soluble in water and dilute acids, and insoluble in benzine, petroleum ether, oil of turpentine, and carbon disulphide.—Chem. News, Aug. 30, 1895, 105; from Chem. Ztg.

*Mould-Fungi—Assimilation of Nitrogen*.—According to the investigations of Puriewitsch, the mould-fungi—*Aspergillus niger* and *Penicillium glaucum*—are capable of assimilating atmospheric nitrogen. Inasmuch as no growth was observed in these fungi when the nutrient solution was completely devoid of nitrogen, the author added traces of ammonium nitrate, while carbon was derived from tartaric acid and cane sugar. The quantity of assimilated nitrogen proved to be approximately in proportion to the cane-sugar offered, and by increasing the sugar was increased to a greater degree than the quantity of dry substance formed.—Pharm. Centralh., Jan. 23, 1896, 47; from Ber. D. Bot. Ges., 1895, 342.

*Penicillium Cupricum—Identity with Penicillium glaucum*.—The fungus which has been detected thriving even in strong solutions of cupric sulphate, and described under the name of *Penicillium cupricum*, has been determined by J. de Seyner to be simply a form of *Penicillium glaucum*, assuming the ordinary appearance of this fungus when transferred to a dif-



ferent medium.—Pharm. Jour., Dec. 28, 1895, 535 ; from Bull. Soc. Botan. de France, 1895, 556.

*Trichophyton*—*Physiology of the Ringworm Fungus*.—L. Roberts states that an examination of several varieties of fungus that occur in ringworm and allied diseases shows that their distinguishing feature is their ability to digest horny tissues, probably by means of a ferment. This

*Keratolytic Group of Fungi*, as the author terms it, includes *Favus*, the various species of *Trichophyton*, some species of *Aspergillus*, and probably others not yet indentified. There are at least two natural distinctions observable in the purely trichophytic fungi, viz., a kind that digests both the cuticle and the cortical substance of the hair simultaneously, and one that digests the cortical substance, but leaves the cuticle unaffected, or attacks it only at a late period.—Pharm. Jour., Dec. 28, 1895, 535 ; from Jour. de la Pathol. et Bact., 1895.

*Pachyma Cocos* and *Myliitta lapidescens*—*Proximate Composition*.—In view of the fact that the chemical constituents of the peculiar fungus formation on coniferous roots, *Pachyma cocos*, have so far been only incompletely determined, though the subject of numerous examinations, E. Wintersheim has undertaken the proximate analysis of two specimens from different sources, and compares the results with those of a proximate examination of a similar fungoid formation, *Myliitta lapidescens*. Omitting the details of the author's examinations and analysis, his results are tabulated by the reporter as follows :

	<i>Pachyma Co- cos I.</i>	<i>Pachyma Co- cos II.</i>	<i>Myliitta lapides- cens.</i>
Protein-substance .....	0.56 per cent.	1.00 per cent.	2.36 per cent.
Chitin-like substance .....	0.60 per cent.	1.00 per cent.	0.91 per cent.
Aether extract .....	0.35 per cent.	0.42 per cent.	0.10 per cent.
Ash .....	0.06 per cent.	0.25 per cent.	0.20 per cent.
Water .....	16.86 per cent.	12.29 per cent.	4.56 per cent.
Grape sugar ..	1.40 per cent.	1.13 per cent.	.....
Fungus-Cellulose .....	2.25 per cent.	3.24 per cent.	2.80 per cent.
Pachymose. ....	76.21 per cent.	79.84 per cent.	.....
Saccharo-colloids .....	.....	.....	88.98 per cent.

The author's analytical results incline him to the view that *Pachyma cocos* is not simply a fungus, or sclerotium, as believed by Ed. Fisher, by Fries, and by Prillieux, but that it is mainly a product of change of the wood-elements of the roots upon which the fungus is formed.—Arch. d. Pharm., 233, 1895, No. 6, 398-409.

#### LICHENES.

*Crustaceous Lichens*—*Morphology and Physiology*.—G. Lindau has carried out a series of observations on the morphology and physiology of

crustaceous lichens and communicates his results in "Bot. Centralbl." (1896, 60), among which the following are mentioned as the more important: In those forms which live on the bark of trees, there is a portion of the thallus—the basal layer—altogether destitute of gonids, which grows in the interior of the periderm between the layers of cells. In the *Hypophlæodæ* this layer extends rather deep; in the *Epiphylæodæ* it is limited to the uppermost strata. A similar structure occurs in the higher lichens, when the hyphæ of the basal layer, which is destitute of gonids, or of the rhizoids, may also penetrate between the cells of the periderm. This portion serves, in the first place, to fix the lichen, possibly also aiding in its nutrition. The growth of the hyphæ is entirely intercellular through the separation of the layers of the periderm; no perforation of the cell-walls ever takes place. There is no direct absorption of cellulose by the hyphæ, but it is possible that cell-walls which have already undergone a change by the action of atmospheric agents may be absorbed.—Pharm. Journ., May 30, 1896, 423.

LYCOPODIACEÆ.

*Lycopodium*—*Detection of Pollen*.—A. Folleto recommends two reactions of pollen to detect its fraudulent addition to lycopodium. The reagent used for the first is prepared, according to Möller, by dissolving pure zinc in hydrochloric acid, filtering the solution through glass wool, concentrating to syrupy consistence, and then adding potassium iodide and iodine to saturation. The pollen is at once colored yellow-red by this reagent, while the lycopodium is not, though it acquires a yellow color after prolonged heating during which the pollen becomes dark red or nearly black. The second reagent consists of methyl green, which colors the pollen green, but not the lycopodium.—Pharm. Centralh., Sept. 12, 1896, 527; from Bollet. Chim. Farm., 1895, 358.

AROIDEÆ.

*Arum Maculatum*—*Presence of Saponin*.—The poisonous effect of *Arum maculatum* has by Spica and Biscaro been ascribed to saponin, while Greshoff regarded this effect to be due to the presence of sharp-pointed crystalline needles of calcium oxalate. Schneegans has now reinvestigated the subject in controversy and has determined by Kobert's method that the tubes of *Arum maculatum* contain saponin.—Pharm. Centralh., Dec. 19, 1895, 731; from Jour. der Pharm., v. Els. Lothr., 1895, 295.

TYPHACEÆ.

*Typha latifolia*—*Possible Utility of the Pollen*.—Dr. Rodney H. True calls attention to the pollen of the common "cat-tail" as being possibly useful as a substitute of or for similar use to lycopodium. In the mass this pollen has a bright yellow color, much deeper than the pale creamy yellow

of the lycopodium. When rubbed between the fingers much the same slippery feeling though less marked than in the latter is noticed, and it is also somewhat more readily wetted by water. It is tasteless and has a faint odor resembling somewhat that of freshly-opened pumpkins. When examined under the microscope, the pollen grain is shown to be four-celled, the two dividing planes cutting each other at right angles and perpendicular to the same plane, giving to the object when seen end-wise with reference to the individual cells, a packet-like appearance. The surfaces unless highly magnified appear smooth. It is very slightly roughened with minute projections. The contents have a granular appearance. In size (0.035–0.039 mm.) the pollen grain is approximately the same as lycopodium (0.030–0.036 mm.). The pollen is accompanied by numerous small slender spikes, derived from the male flowers. In this connection, the author observes, it is of interest that in Japan the pollen of a related species, *Typha Japonica*, Miq., is used as a drug called "Hoh-on," and that in China the pollen of *Typha bungeana* is used as a desiccant, astringent, styptic and sedative.—Pharm. Rundschau., April, 1896, 88.

## CYPERACEÆ.

*Tabasheer—Composition of Different Samples.*—This peculiar, white, smooth, porcelain-like substance, rarely found deposited in the knots of the bamboo, where it forms a thin saucer-like layer, is regarded as possessing valuable properties, being used by the East Indian population of Trinidad as a specific against fever, malaria and ague. This substance, which is known by the name "tabasheer," or "tabusheer" has been analyzed by Tonningen (1860), the sample coming from Java. Walter H. Ince has now examined three samples of this rare substance, two of them derived from Trinidad, the other from the East Indies, and finds that its composition varies considerably. His results are given as follows, the results of Tonningen's analysis being given also for comparison :

	Tonningen's Analysis.	I. Trinidad.	II. East India.	III. Trinidad.
SiO <sub>2</sub> .....	86.39	91.69	89.77	90.45
Fe <sub>2</sub> O <sub>3</sub> .....	.42	trace.	.665	trace.
CaO .....	.24	2.057	3.81	.725
K <sub>2</sub> O .....	4.81	4.332	3.35	1.524
Organic Matter .....	.51	.52	.0	3.122
Water .....	7.63	1.613	3.051	4.13
	100.00	100.112	100.656	99.961

—Pharm. Jour., 722, 1896, 141.

## GRAMINACEÆ.

*Wheat—Character of the Proteids of the Grain.*—Wheat flour is derived entirely from the endosperm of the wheat grain, the germ or embryo being removed before the grain is ground. Dr. M. O'Brien has previously shown that the proteids of the flour are two globulins, coagulating at about 55° C. and 75°–80° C. respectively, proteose not coagulable by heat, and the mother-substance of gluten. He is now able to show that the proteids of the germ and of the flour seem to correspond, so far as the globulins and proteoses are concerned, but that they differ widely in the remaining proteid matter, the insoluble gluten of the endosperm being replaced by albumin in the germ. The supposed albumin obtained from flour by Osborne and Voorhees, and named by them leucosin, is thought by Dr. O'Brien to be rather a globulin.—Pharm. Jour., Feb. 1, 1896, 85; from Annals of Botany, ix., 543.

*Wheat—Yield of Good Flour by the Cylinder Process.*—Aimé Girard states that from an analytical and practical study of the produce of these grindings executed under the superintendence of a commission, it appears distinctly that the limit of the yield of flour fit for the manufacture of white bread, porous, well risen, and easily digestible, as modern consumption requires, lies between 60 and 65 per cent. of the weight of the wheat. Beyond this point, there is produced about 5 per cent. of mealy product, decidedly acid, and calculated to yield only compact loaves, flat, with a greasy crumb, dark colored, loaded with water, and difficult of digestion.—Pharm. News, Jan. 17, 1896, 35; from Compt. rend., Dec. 16, 1895.

*Flour—Rapid Microscopical Determination of Mineral Additions.*—Rondelet proposes the following method which enables the detection of mineral substances—such as gypsum, barium sulphate, etc.—in flour within less than five minutes: A little of the suspected flour is placed on an object glass, one or two drops of a mixture of aqueous solution of aniline and of alcoholic solution of fuchsin are added, then the same quantity of tincture of iodine, and finally distilled water. The mixture is then covered with a cover glass and examined under the microscope. Under the action of the fuchsin and iodine the cellulose of the flour becomes brownish-red, and the starch granules become black. The mineral substances become yellowish; but upon the addition of a drop of water, the mounted preparation becomes clear, and the crystals of mineral matter are exhibited in their normal color and are sharply defined from the natural components of the flour.—Pharm. Centralh., July 4, 1895, 388; from Zeitschr. f. Nahrungsm.-Unters.

*Flour—Microscopic Test.*—E. Vinassa describes the following method for determining flour adulterations microscopically: Two Gm. of a well-mixed sample of the flour are carefully mixed in a porcelian capsule with 5 Cc. of hydrochloric acid, 100 Cc. of water are added under constant stirring,

and the mixture is boiled 10 minutes. When cool it is allowed to settle in a glass cylinder, after which the clear liquid is decanted, the residue is neutralized carefully, and centrifuged. The residue is then replaced in the cylinder containing 1½ to 2 per cent. solution of crystallized aniline green, the mixture heated moderately, again centrifuged, and the residue so obtained treated on a filter with a warm 1 per cent. solution of ruby-red, after which it is washed with distilled water. The starch-cell membranes appear red under the microscope, while the hardened cells, which are characteristic of the probable adulterant, appear green. The method is applicable to a quantitative estimation of the adulterant. — Pharm. Centralh., Sept. 26, 1895, 553; from Bollet. Chimico-farm., 1895.

*Rice—Adulteration (?) with Oil.*—E. Vinassa having called attention to an adulteration (?) of Rangoon rice with oil, H. Damköhler explains that it is customary in the rice-mills of Bremen to glaze the rice by rotating it in revolving drums after the addition of small quantities of rape-seed oil. Such "glazed" rice is in demand in some localities.—Pharm. Centralh., Oct. 10, 1895, 579.

*Sugar Cane—Gradual Degeneration.*—Dr. J. H. Walker points out that the various cultivated varieties of sugar cane exhibit gradual degeneration of the sexual organs. The pollen-grains display various degrees of sterility, until the stamens finally disappear altogether. In other varieties this degeneration also extends to the female organs, the ovary being in some cases entirely suppressed. Finally, the inflorescence itself is reduced to a very rudimentary condition. This appears to be the result of the selection by cultivators of those varieties in which the energy is thrown into the production of sugar-producing stems.—Pharm. Jour., May 30, 1896, 424; from Bot. Centralbl., 1896, 37.

#### PALMACEÆ.

*Saw Palmetto—Pharmacology.*—Dr. Henry H. Rusby communicates a paper on the saw palmetto—*Serenoa serrulata* (Michx.), Hook. f. (*Sabal serrulatum*, Nutt.), the fruit of which has in recent years acquired considerable reputation as a remedial agent. This palm is distributed in greatest abundance along the Atlantic coast of Florida, from Mosquito Inlet to Jupiter Inlet, but extends northward as far as Northern South Carolina, where it grows sparingly along the coast. The plant is characterized by its horizontal and subterranean trunk, which is from six to eight inches in diameter, and extends under ground at a depth of two to four feet in a length of from two to thirteen feet, numerous roots, about half an inch in diameter penetrating four to ten feet deeper. This underground stem, usually termed the "root," is said to be rich in tannins and to have been successfully experimented with as a tanning agent. The fruit, however, is the important part medicinally. The branching spadices of the plant, of which there are several, form large pendulous panicles in fruit, 18 to 24

inches long, and weighing 6 to 8 pounds. Collection of the fruit is begun in August, before maturity, and it extends into January, or even, in rare seasons, to March. The fruit stem is clipped with pruning shears, and the fruit is shaken into a basket, a bushel weighing 54 pounds when fresh, and 30 to 42 pounds when dried, according to the extent to which the drying is carried. The fruit as it appears in the market is of oblong-ovoid form, from one-half to one inch in length, and about half as broad—that grown on the coast being nearly twice as large as that of the interior. The wrinkling in drying is not excessive. The wrinkles are rather few and not very elevated or sharp, separating rather large, smooth-flattened areas. If sun-dried, the wrinkling is more abundant and stronger. Except for the wrinkles the surface is smooth, very slightly glaucous and of a black color with a brownish shade. Structurally, the fruit is a one-seeded drupe. The pericarp possesses a well-distinguished epicarp, sarcocarp and putamen. The epicarp is rather thick and tough, a little more so than that of the date, and is strongly cutinized. The sarcocarp is slightly fibrous and stringy. On being stripped off, a thin sub-layer of it is left clinging to the putamen. The putamen is crustaceous, thin, smooth and free from the contained seed. The latter is somewhat smaller as compared with the fruit than is the case with the olive, for example, and is oblong, elliptical in longitudinal section, nearly circular in transverse section as to general outline, the ventral surface a little flattened and bearing a distinct raphe running the entire length. The hilum is small, sub-circular and basal. The embryo is very small and upon the dorsum near its base, differing in this particular from the date seed, which bears the embryo near the centre of the dorsum. In consistence it is sub-osseous and solid. An excellent histological description of the fruit, accompanied by two plates (showing transverse section of the entire fruit, the epicarp, the mesocarp, of fibro-vascular bundle, of the endocarp, of the seed coat, and also the external cuticular sheath and of a single cell of the perisperm) is given by Mr. W. A. Bastedo. So far as the medicinal uses of palmetto berries are concerned, the standard literature has very little reference to these. The first introduction of the fruit was apparently by Dr. J. B. Read, of Savannah, who reported upon its successful use as a nutrient and catarrhal remedy. It is credited with being sedative, pseudo-narcotic and diuretic, is said to improve digestion, increasing the flesh and strength, to be remedial of neuralgic disorders, allaying irritation of the mucous membrane of the throat, nose and larynx, and is used with decided success in phthisis pulmonalis, bronchitis, acute and chronic laryngitis, etc. Other uses are dependent upon its supposed efficiency in disorders of the genital organs, and it is upon printed record that the remedy is a sexual tonic and reducer of prostatic enlargement.

The "pharmacy" of palmetto berries has received the attention of Prof. Virgil Coblentz, who finds the pulp to contain a small percentage of a

volatile oil having the peculiar and persistent odor characteristic of the berries, a large proportion of fixed oil, a fat, an alkaloid, an indifferent resin, dextrin, and a remarkably large proportion of glucose. The seed yielded an additional quantity of fixed oil (12.12 per cent.), of a pale yellow color, sp. gr. 0.9103, bland and insoluble in alcohol. It is soluble in ether and chloroform, and saponifiable by alcoholic alkalies, but not by aqueous potassium hydrate. The seed also contains some resin and sugar. The air-dry berries yield 34.4 per cent. of dry extract to alcohol, and lose 10.125 per cent. of their weight on drying at 100° C.—Proc. New Jersey Pharm. Assoc., 1895, 45-65.

*Dates*—*A possible source of Alcohol*—*Composition, etc.*—Lebuy has determined the composition of Mesopotamian dry dates, and concludes that they may possibly prove useful as a source of alcohol. The fruit consists of 85.1 of pulp and 14.9 of kernel; the pulp consisting of 66.07 dextrose, 1.28 starch, 2.97 nitrogenous bodies, 1.03 fat, 4.26 gummy bodies, 4.97 cellulose, 1.96 mineral salts, and 17.46 per cent. of water. According to these figures 100 kilos would yield 37-38 liters of 90° alcohol. It is noteworthy that cane sugar was found absent, the more so because Lindet has found the flesh of Tunis dates to contain 38 per cent. of cane sugar along with 23 per cent. of dextrose.—Pharm. Jour., Aug. 31, 1895, 191; Zeits. f. Spiritusind.

*Coco-Nut*—*Cultivation*.—The "Bulletin of the Botanical Department of Jamaica" (2, 182, 1895) contains a practical paper on the cultivation of the coco-nut, giving some details as to the soil and climate, sowing, transplanting, tillage and manuring, and yield. Reference may be had to this paper in Amer. Jour. Pharm., Nov. 1895, 581-583.

#### LILIACEÆ.

*Japanese Lily Bulbs*—*Value as Food*.—Dr. Ostermayer has made an analysis of Japanese lily bulbs, which have been used to some extent for culinary purposes, and finds them to contain a large percentage of albumen, its composition being as follows: Water, 63.20 per cent.; fat, 0.42 per cent.; albumen, 5.25 per cent.; crude fibre, 1.40 per cent.; ash, 1.60 per cent.; extractive substances, free from nitrogen, 27.90 per cent. The bulbs have been used for preparing palatable dishes, for garnishing meats, etc., but they are easily cultivated, and are therefore looked upon as likely to be used extensively as food. The lily is a familiar ornamental plant, characterized by its magnificent scarlet flowers.—Pharm. Centralh., Febr. 6, 1896, 80; from Ztschr. f. Obst. u. Gartenbau.

*Aloe Africana*, Mill.—*Description of Plant, etc.*—The "Pharm. Journal" (Oct. 12, 1895, 316), calls attention to the recent flowering of a specimen of *Aloe Africana*, Mill., at the Kew Gardens. The plant has a slender stem about two inches in diameter, crowned with a head of thick, fleshy, spiny leaves, and an erect flower spike some fourteen to sixteen inches

long, covered for the space of about ten inches with orange-yellow buds opening into lighter yellow flowers, from which protrude the orange reddish colored anthers. When in full flower the plant has an attractive appearance; but it is particularly interesting because the plant, and its varieties, are credited with producing Cape aloes. It is said by Tappe, in his "*Floræ Capensis Medicæ Prodrômus*," that the aloes produced from this plant is almost equally as good as that procured from *Aloe ferox*, Lam., though it is probably not so bitter nor so powerfully drastic. The aloes is produced in the eastern district, whence large quantities are annually exported.

*Yucca Filamentosa*—*Proximate Examination of the Root*.—Max Morris has subjected the root of this plant, known as "bear grass" in the northern part of the United States, to proximate examination, and found it to contain wax, fat, caoutchouc, resin, saponin (1.70 per cent.), mucilage, albuminoids and saccharose. The air dried root contained 6.12 per cent. of mixture, and yielded 5.79 per cent. of ash. It apparently contained no tannin.—*Am. Jour. Pharm.*, Oct., 1895, 520-521.

#### DIOSCOREACEÆ.

*Shu-Lang Root*—*Value as a Dye*.—The "Kew Bulletin" (Sept., 1895), describes under the title of Shu-Lang root, the *Dioscorea rhipogonoides*, Oliver, a species of yam indigenous to the mountainous regions of Hong Kong and Formosa. It occurs in commerce under the names of "dye root" or "dye yam," and is used in Canton to dye grass cloth and the common grades of silk a peculiar reddish brown. It is gathered in spring and early summer. In Tonquin it is called "faux gambir."—*Amer. Jour. Pharm.*, April, 1896, 212.

#### IRIDEACEÆ.

*Saffron*—*Cultivation in Kashmir*.—According to W. R. Laurence the saffron of Kashmir is famous for its bouquet, and is in great request both as a condiment and as a pigment for the "forehead marks" of the Hindoos. The cultivation of the saffron is peculiar, and the industry an ancient one, but there is little chance of the industry extending so long as the present primitive method of reproduction from seed is exclusively resorted to. Respecting the collection of the saffron the author observes that the harvest begins about the middle of October, the whole flower being picked. Having been dried in the sun, the next step is to remove the three long stigmata from each. The stigma has a reddish-orange tip, and the finest quality of saffron—*shahi zafran*—consists of such tips only. The rest of the stigma is white and is sold under the name of *mongla*. The flowers are next beaten lightly with sticks and winnowed, after which the whole mass is thrown into water, when the petals swim and the other parts sink. The sunken matter—*niwal*—is collected; then the



petals are again dried, beaten with sticks, and again plunged into water, the *niwal* being collected as before; and this process is repeated a third time, the *niwal* becoming poorer each time. The *niwal* of the third stage is then mixed with that of the first stage, when a saffron is obtained which is lighter in color and of fainter odor than *mongla*, and is known in the trade as *lacha*.—Pharm. Journ., April 4, 1896, 272.

*Saffron—Falling off in the Trade of Valencia*.—According to the "Bollettino di Notizie Commerciali" the diminution in the saffron trade of Valencia is probably owing less to a decrease in the demand than to the fact that some of the saffron is exported abroad direct from the interior. The expenses of carriage to Valencia are then saved, but there is not the same guarantee as to weight or quality, each district producing a different kind. The buyers are principally French and German, who trade with the East.—Pharm. Jour., Sept. 28, 1895, 264.

*Saffron—New Adulterant*.—The "Pharm. Post" calls attention to a new adulterant of saffron which consists of some undetermined vegetable fibre, colored red and loaded with honey and barium sulphate. It resembles saffron very closely, and has been proved present to the amount of 25 to 70 per cent., but is readily detected by its weight, which causes it to sink to the bottom if the sample is placed into warm water for a few minutes, losing at the same time their color, so that they appear only faint reddish.—Pharm. Centralh., Jan. 2, 1896, 14.

*Saffron—A Proposed Substitute*.—Heim proposes as a substitute for saffron to employ the dried perianth of

*Tritonia aurea*, Poppe (*Crocospa aurea*, Pl.), a handsome bulbous plant, indigenous to southern and tropical Africa, where it is roughly cultivated as a dye stuff. The author states that the dried petals give, when boiled with water, an intensely yellow solution of even finer color than that obtained from ordinary saffron. The yellow coloring matter is more soluble in dilute alcohol and in alkaline solution than in water, but it is insoluble in absolute alcohol and in benzol. The partly dry aqueous extract gives with sulphuric acid a blue coloration, passing to violet, similar to that obtained from saffron. The infusion has a characteristic odor, due probably to a trace of volatile oil, which it loses on prolonged boiling. The fact that the whole flower, and not the stigmas only, contains the coloring matter, indicates that the plant might prove worthy of extended cultivation.—Pharm. Jour., Feb. 1, 1896, 86; from Nouv. Rem. xii., 217.

#### AMOMEACEÆ.

*Ginger—Percentage of Oleo-resin in Different Commercial Varieties*.—Robert G. Davis has prepared the oleo-resin, and gives the percentage obtained from the commercial varieties of ginger by the official process.

The results are shown in the following table, together with percentages of moisture and ash in the samples :

Variety.	Form.	Condition.	Oleo-resin.	Moisture.	Ash.
Jamaica .....	Root.	Bleached	4.62	12.10	5.25
" .....	"	"	4.53	10.40	5.25
" .....	"	Unbleached	2.82	12.50	3.50
" .....	"	"	4.41	9.85	3.65
" .....	Powder	"	4.30	9.05	5.20
" .....	"	Bleached	4.84	9.70	6.55
Race .....	"	.....	4.09	11.10	5.35
" .....	"	.....	5.40	9.15	5.05
" .....	Root	.....	4.02	12.20	5.60
African .....	"	.....	5.75	13.65	4.65
" .....	Powder	.....	6.27	12.60	4.65
Jamaica .....	"	.....	3.73	12.15	3.65

—Amer. Journ. Pharm., Oct., 1895, 519-520.

#### ORCHIDÆ.

*Vanilla*—*Cultivation, Collection, etc.*—W. Krebs contributes a lengthy paper on vanilla in which he gives interesting details respecting its cultivation, collection, preparation for the market, etc. Of the eleven known species of *Vanilla*, two are indigenous to Africa, the others to central and tropical South America. But only two of these species are important for commercial purposes, viz., *Vanilla planifolia*, L., which yields the vanilla of commerce employed for flavoring food and confections, and *V. pompona*, L., the fruits of which are characterized by their intense heliotrope odor, and are important products for the perfumer's art. Other designations, such as *chica*, *cimarona*, *bastarda*, *hova*, *deley*, etc., are applied to varieties of the species named, or to methods of preparation; while *V. aromatica*, L., originally regarded as the true vanilla plant, is now known not to deserve that distinction. The home of the most important species, *V. planifolia*, L., is the hill country of Eastern Mexico, near Vera Cruz, from whence it has been transplanted to tropical South America, and to the European conservatories, and through there it has reached Java in 1819, and the island of Reunion (Bourbon) in 1822. From Reunion it reached Tahiti, and afterwards, in 1836, the island of Mauritius (Isle de France), whence, in 1880, it reached the Seychelles, and in 1890 German East Africa. The most important of these localities is doubtless Reunion, where the industry of cultivating and curing vanilla has reached such dimensions as to completely drive Mexican vanilla out of the European market, while "Bourbon" vanilla finds a considerable market also in America. The climatic conditions of Reunion are very similar to those of Eastern Mexico, having a dry season of about seven months—from May to November—and a wet season of five months, while in Eastern Mexico

the dry season begins in November and ends in May, the seasons thus corresponding with the respective geographical position of the two localities. Similar conditions prevail in Mauritius, which is next in importance as a producer of vanilla, whilst in Java and Tahiti the conditions are reversed, there being seven to eight months of rain and four to five months of dry weather, and consequently unfavorable to the vanilla culture, which requires a prolonged season of dry weather after the final preparation of the fruit. In the Seychelles, and in German East Africa, the industry is as yet undeveloped, but so far apparently not very promising.

Respecting the cultivation, the author observes that the vanilla requires moisture, a loose, well-drained soil, a shady situation—but only within certain limits—and, being a climber, the support of trees, a number of which are mentioned as being in use in Reunion. An important condition is the artificial fructification of the flowers, which in the absence of insects is resorted to in Reunion. In Mexico, this is accomplished by a small native bee, whilst in Tahiti, along with artificial fructification, it is done by bees of Italian breed imported from Chili. As regards the curing and preparation of the vanilla for the market, it is erroneous to suppose that the aroma can be developed only by the artificial methods resorted to. It is true that neither the flowers—which possess a distinct odor—nor the unripe fruit possess the characteristic aroma of the vanilla; but the fruit as it ripens becomes brown and develops the characteristic odor perfectly, the drawback to this natural ripening being that the fruit splits from the free end, loses its contents, and becomes unfit or inferior for the market. The fruit is therefore harvested while still green, but when they begin to turn yellow at the free end, an indication that it has become fully developed. On the larger plantations it is customary to stamp the initial letter of the plantation or owner upon each fruit, this serving not only as a trade mark, but also as a method of identification in case of theft. The “preparation” of the fruit, which has for its purpose the acceleration of the ripening process and to prevent contamination with harmful impurities, differs in the various localities, and is, so far as Mexico is concerned, a carefully guarded secret in essential particulars. The hard epidermis characteristic of the Mexican vanilla appears to be due to the employment of certain oils during the process of preparation or curing of the fruit, while in the other countries of its production no oils are used. The fruit, also, instead of being allowed to wilt in the air, as in Mexico, in other countries is dipped in hot water or dried in ovens for the same purpose. It is the practice in Reunion to dip the green fruit placed in flat baskets into water at about 90° C. for 12 to 30 seconds, while in Mauritius the fruits are packed into bundles of about two cubic feet in size, wrapped with banana leaves, and placed in an oven for from 12 to 30 hours. After treatment with hot water, the fruits are exposed to the sun for 15 to 20 days, and afterwards they are exposed in the shade for two to three months more, being wiped

with flannel cloths and turned at least twice a week during the entire period, and contact with each other is carefully avoided. When they have acquired a handsome brown color, and are sufficiently dried, the fruits are carefully sorted according to their length, form and quality, and put up in bundles of from 50 to 60 each; but no such care appears to be given to the vanillas of the Antilles, of Tahiti, or of Java. The author devotes a considerable portion of his paper to the cases of poisoning that have at different times been reported as being due to vanilla used in ices, foods, etc. While it is true that the vanilla vines are often supported and shaded by trees that are known to contain poisonous constituents, particularly *Jatropha curcas*, he expresses the opinion that the poisons can hardly have their origin from these sources. Indeed, he does not believe the vanilla at any time to contain a poisonous constituent, but considers it very probable that the poisons are introduced from other sources, and particularly, in the case of ices, from the ice used in their preparation.

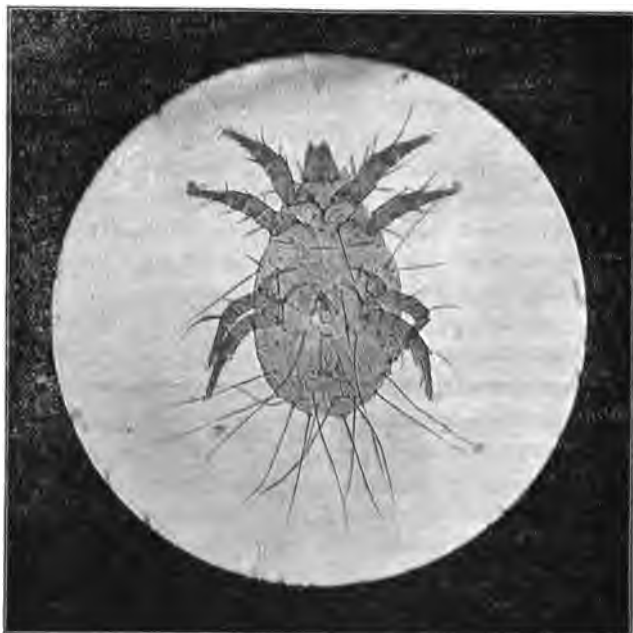
The author, furthermore, calls attention to the fact that the production of artificial vanillin has in no respect affected the market value of vanilla, the fluctuation observed during the years since the production of artificial vanillin being caused by variations in the crop. He observes that the demand for the artificial vanillin is almost exclusively for the preparation of perfumery and cheap confectionery. So far as adulterations of vanilla is concerned, they are generally, so clumsy as to be easily detected. Finally the author proposes that a step in the right direction would be to prepare the green vanilla at the place of its production so as to produce at once an extract, but this is a problem that requires further consideration and development.—Pharm. Centralh., Aug. 29, Sept. 5 and 12, 1895, pp. 487-490, 503-507, and 517-521.

*Vanilla*—*Species yielding the Commercial Varieties*.—R. A. Rolfe states that the principal species of vanilla is *V. planifolia*, Andr., a native of Southeastern Mexico. *V. pompona*, Schiede, yields the Guadeloupe variety, and *V. Gardneri*, Rolfe, is said to yield Brazilian and Bahia vanilla. *V. appendiculata*, Rolfe, and *V. odorata*, Presl., produce aromatic fruits, but are not known to be cultivated, whilst *V. phæantha*, which possesses but little perfume, is under cultivation in Jamaica and Trinidad. The known species of the genus are fifty in number.—Pharm. Journ., Sept. 28, 1895, 263; from Kew Bulletin, No. 104, 169.

*Vanilla*—*Parasite Infesting the Beans*.—Hilton H. Sawyer has succeeded in obtaining a good photomicrograph of a parasite, which he has observed on vanilla beans (see Fig. 39), and which he believes to be a species of *Tyroglyphus*, probably *T. longior*, belonging to the *Arachnoidea*, to which also belong spiders, scorpions and ticks. He has found several species upon vanilla, the most numerous belonging to *T. siro*, *T. siculus*, and the species shown in the cut. A can of vanilla when opened may present a very rich appearance, and on superficial examination be pronounced of

the very finest quality. If infested—the mites are usually found only on the finest quality of beans—perhaps the first thing that will attract attention is the odor of the small end of a bundle, which is quite characteristic,

FIG. 39.



*Tyroglyphus Longior.*

and has been described as rose-like. A closer inspection will show the beans more or less covered with a brown powder, and the naked eye, or still better the hand magnifier, will reveal little white specks moving to and fro. While the author first observed these mites in 1887, they have been known for a long time, an account of them being given in "Hooker's Micographia," a work published some time in the seventeenth century. So far no method has been devised whereby the ravages of this insect can be prevented. Fortunately, the presence of the mite does not unfit the bean for its various uses.—Am. Drug. & Chem. Rec., Aug. 25, 1895, 109.

*Nigritella suaveolens*.—*Presence of Vanillin in the Flowers.*—V. Lippmann has determined the presence of vanillin in the flowers of *Nigritella suaveolens*. The flowers also contain a substance having the odor of heliotropin or piperonal, but the author was unable to isolate it.—Pharm. Centralh., Oct. 10, 1895, 581; from Ber. d. Chem. Gesel.

*Cypripedium*.—*Poisonous Influence of various Species.*—Prof. D. T. MacDougal directs attention to the fact that the leaves and stems of *Cypri-*

*pedium spectabile* and *C. pubescens* exert a poisonous influence on the human skin. Numerous experiments have shown that the irritant action is due to the secretion of the glandular hairs only, and that this action increases with the development of the plant, reaching a maximum effect during the formation of the seed capsules.—Amer. Jour. Pharm., April, 1896, 218–219; from Bulletin No. 9, Part vii, Minnesota Botanical Studies.

## THYMELACEÆ.

*Daphne alpina* and *D. gnidium*.—*Localization of Daphnin*.—L. Sauvan has investigated the distribution of daphnin in *Daphne alpina* and *D. gnidium*, employing the reactions of the golden yellow color produced by the glucoside with solution of potash, and of the orange or blood-red color produced by it with nitric acid. He found that the root contains but little daphnin; the stem is much richer in the glucoside, which is principally contained in the outer cell-layers of the cortex and in the bark, and is most abundantly present when the plant is flowering and fruiting. Both petiole and lamina of the leaf yield the reaction, but the fruit and the seed coats contain more of the glucoside than any other part of the plant. *D. alpina* appears to contain more daphnin than *D. gnidium*.—Pharm. Journ., Febr. 29, 1896, 164; from Rep. de Pharm., (3) vii, 55.

## PROTEACEÆ.

*Leucodendron concinnum*.—*Chemical Constituents*.—E. Merck has obtained from the leaves of *Leucodendron concinnum*, a proteacean plant growing at the Cape of Good Hope, a glucoside and a crystalline bitter substance. The glucoside, for which he proposes the name

*Leucoglycodrin*, is obtained by precipitating an alcoholic extract of the leaves with ether after purification with lead acetate. It is an amorphous powder, has a bitter taste, dissolves in hot water, but separates as a jelly on cooling. Analysis and molecular weight determination led to the formula  $C_{27}H_{42}O_{10}$  or  $C_{27}H_{44}O_{10}$ . The bitter crystalline substance is named by Merck

*Leucodrin*.—It resembles salicin, has the composition represented by the formula  $C_{16}H_{16}O_8$ , and appears to be identical with the substance obtained by Merring Beck from the same plant in 1886, and named by him *proteacin*. O. Hesse has also investigated this substance and has adopted the name suggested by Merck in preference to that of *proteacin*. He obtained it by extracting the leaves with ether, treating the ether residue with hot water and lead acetate, separating lead from the clear liquid, evaporating, extracting the leucodrin from the residue of evaporation with ether, and recrystallizing it from alcohol, glacial acetic acid, or water. It formed colorless prisms, readily soluble in hot water, ether, or alcohol, slightly in chloroform or cold water. It is not a glucoside. Its aqueous solution is not precipitated by gold or platinum chlorides, silver nitrate, or

lead acetate, but basic lead acetate gives a copious precipitate on the addition of ammonia. The molecular weight, according to Merck's determination, agrees best with the formula  $C_{18}H_{20}O_9$ .

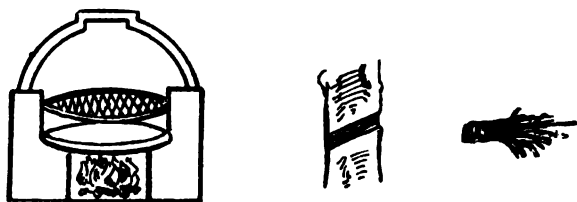
In 1886, Schuchardt had obtained this substance in a pure state, and presented a specimen, under the name of proteacin, to the Museum of the Br. Pharm. Society. Hesse obtained from Schuchardt a quantity of the leaves from which it was stated to have been extracted, but they proved to be the leaves of the sugar-bush, *Protea mellifica*, yielding a substance of entirely different chemical nature. He has since subjected the leaves of *Protea Mellifica* to chemical examination, and finds them to contain from 2 to 5 per cent. of hydroquinine, associated with an acid which he has isolated, studied and named

*Proteacic Acid*. It was obtained in the form of white granular crystals, which become yellow on exposure to the air, and melt at  $187^\circ$  under evolution of carbonic acid. The acid is readily soluble in hot water and in ether, sparingly soluble in cold water, and insoluble in benzene and chloroform. It has a strong acid reaction, decomposing alkali carbonates and neutralizing bases, has a composition which suggests the formula  $C_9H_{10}O_4$ , and is evidently the highest member of the series to which homoprotocatechuic acid belongs. The plant yielding it is common in South Africa, where it is known as the "sugar bush," on account of the sweet sap contained in the flowers.—Pharm. Journ., May 30, 1896, 426; from Merck's Berichte, 1895, and Annal. der Chem., 290, 314.

#### LAURINEÆ.

*Camphor—Method of Production in Formosa*.—An English missionary, Rev. Geo. Ede, gives the following account, accompanied by the cuts shown by Fig. 40, of the process of the Chinese distillers in Formosa for

FIG. 40.



obtaining camphor: A fire place is built and a shallow iron vessel—the kind used in Formosa for boiling rice—inserted therein. The walls of the fire-place are carried up a short distance and a meshed frame placed across the opening. A large earthenware vessel is then placed inverted over the top, made to fit as closely as is safe, to prevent the escape of vapor. The pieces of wood are chipped off from the tree with an adze diagonally to the grain. Each piece of wood is then beaten till it splits

more or less up along the grain, in order to expose the camphor contained in it. These slices are about the size of a man's hand, or less, and not very thick. Water—not too much—is put in the iron vessel; the prepared pieces of wood are placed on top of the meshed frame, and a wood or charcoal fire is lighted under the iron vessels. It must be a slow fire, and the water must not boil violently. This cumbersome, uneconomical process has been followed for generations, and will probably continue to be resorted to so long as there is a camphor tree left in the island.—Chem. and Drugg., Jan. 4, 1896, 6.

*Camphor Leaf Oil—A Possible Source of Camphor from Cultivated Trees.*—The continued scarcity of camphor, the restricted territories of its production from trees of native growth (Japan and Formosa), and the evident gradual exhaustion of the native forests, has prompted David Hups to make some experiments with the view to determine whether camphor could be profitably produced from the leaves of cultivated trees. It is evident that the camphor tree is able to grow very luxuriantly and extensively in the warmer temperate and tropical parts of the world, far removed from China and Japan, but the slow growth of the tree would prevent all but large capitalists from opening up plantations and waiting for the plants to sufficiently mature so as to be utilized in the manner at present employed for the production of camphor. In Ceylon, where some energetic planters have taken up the camphor question, the tree grows well at elevations of 5000 feet and less; it has the habit of a willow in the island, and it has been suggested that, like the willow, the trees should be coppiced, and the leaves and branches used for preparing the oil. The author distilled oil from leaves that came from an umbrageous tree growing in the Government Gardens at Octacamund, and from leaves obtained from younger trees grown at Naduvatum on the Nilgiris, a district more than a thousand feet lower than Octacamund. The first sample yielded one per cent. of oil, of slightly yellow color, sp. gr. at 15° C. of 0.9322, having a rotation of +90.4 in a 2 decimeter tube, and contained not more than 10 or 15 per cent. of camphor. The Naduvatum trees yielded only about one-half of one per cent. of volatile oil, but had a mass of crystalline camphor suspended in it, which, when expressed firmly, weighed two ounces. The clear oil had a sp. gr. 0.9314 at 15° C., twisted a ray of polarized light +54° in a 2 decimeter tube, and contained an additional 50 per cent. of camphor, making the total amount in the distillate very satisfactory, viz., 75 per cent. The camphor when dissolved in spirit, twisted a ray of light +30°. It seems possible that the higher altitude of Octacamund influences the formation of camphor unfavorably.—Pharm. Journ., Jan. 11, 1896, 21–22.

*Ngai Camphor—Production and Marketing.*—Some interesting correspondence respecting the production and marketing of Ngai Camphor (the product of *Blumea balsamifera*, D. C.), is given in the "Kew Bulletin"



(Nov., 1895, 275). The leaves of the *Blumea* are collected in the fall and winter months, and, after being allowed to wilt for a couple of days, are placed in a still, consisting of a cask about 2 feet high, open at both ends, and of a diameter suitable to place over a large Chinese frying-pan. The pan is filled with water, and over this is placed a coarse sieve of woven bamboo. The cask is cemented with clay to the edge of the pan, and, after receiving the charge of 30 or 40 pounds of leaves, a large brass basin is placed on the upper end of the cask and is filled with cold water, which is frequently changed. Fire is placed under the frying-pan, and distillation is continued for about four hours, when the bottom of the basin is found coated about one-sixteenth inch thick with a crystalline layer of the crude camphor, called *ngai-fen*. About 15,000 pounds of this crude camphor is annually shipped from Hainan to Canton, where it is refined, and is then known as *ngai-pien*.—Amer. Jour. Pharm., April, 1896, 213-214.

*Lai-fan*—*A Crude Borneol*.—Flückiger describes "lai-fan," a crude, watery borneol, which is probably identical with Ngai camphor. It occurs as a thick paste having numerous crystals distributed throughout the mass, and is marketed in pots holding about  $6\frac{1}{2}$  ozs. each. It is employed in China as an application in nervous headaches.—Merck's Market Rep., July 1, 1895, 264.

*Cinnamomum Cassia*—*Character of the Tannin Principle*.—The statement that the nature of the tannin present in cassia cinnamon interferes at times very much with the process of percolating the drug with aqueous menstrua, occasionally rendering percolation almost impossible, has induced Thomas R. Thornton to undertake some experiments, from which he concludes that the tannin principle of *Cinnamomum Cassia* is either a phlobaphene as it exists in the drug, or that it acquires a phlobaphene character when brought in contact with water. The author describes in some detail the methods employed with a view to isolating the tannin, but found all of the ordinary methods unsuccessful. By the action of hide powder he estimated the tannin principle in decoctions of 20 grammes each of three samples to be 3.70, 3.20 and 4.80 grammes respectively, whilst the gelatin and alum process yielded 3.37, 3.83 and 4.32 grammes respectively from the same samples. By the action of fused alkali in the tannin, proto-catechuic acid was found. The reactions of the cinnamon tannin are given in a table, along with those of white oak tannin and gallo-tannic acid by the same reagents, as follows :

Reagent.	Cinnamon Tannin.	White Oak Tannin.	Gallotannic Acid.
Copper Sulphate and Ammonium Hydrate. } Bromine Water..... Ferric Chloride..... Ammonio Ferric Sulphate Lime Water..... Lead Acetate.....	Brownish red ppt. Dirty green ppt. Brownish yellow ppt. Blackish green ppt. Blackish green ppt. Ppt. turning brownish Brick-red ppt.	Precipitate. Brown green color. Yellow ppt. Green color and ppt. Green color and ppt. Ppt. turning pink. Pale yellow ppt.	No ppt. Brown ppt. No ppt. Blue color and ppt. Blue color and ppt. Ppt. turning blue. White ppt.

—Amer. Jour. Phar., Aug., 1895, 400-403.

*Lindneria sericea*, Blume—Cause of Variation in the Commercial Volatile Oil.—The "Chemist and Druggist" (Sept. 28, 1895, 502-503), observes that one parcel of the essential oil of this plant, known under the name of

*Kuromoji Oil*, differs in odor from another, and inquiries were therefore set on foot to seek an explanation. These have elicited the fact that

FIG. 41.



Kuromoji Plant.

kuromoji oil is not produced on a large scale by essential oil distillers, but by small farmers in Japan, each of whom distils the yield of the shrub grown on his own estate. These small stocks are then bought up by dealers in various centres and mixed together, almost precluding the possibility of getting exact uniformity in aroma. The oil is obtained from the young shoots and leaves of the plant, a leaf-branch of which is shown by Fig. 41, drawn from a herbarium specimen and about half the natural size. The shrub grows wild in the mountainous districts of Japan, and attains a height of 4 to 6 feet. Messrs. Schimmel & Co., who first called attention to kuromoji oil, in 1889 (see Proceedings 1890, 577), state that the oil is prepared from the wood of the plant. It possesses a pleasant, balsamic odor, has a sp. gr. of 0.892, and is used in perfumery, especially for soap-making.

#### POLYGONACEÆ.

*Polygonum cuspidatum*—*Constituents of the Root*.—A. G. Perkin has determined some of the constituents of *Polygonum cuspidatum*, a native of China and Japan, which flourishes in parts of India and Russia. The freshly-gathered roots consist of a thick succulent bark, of an orange-red color, and a central woody portion of a light yellow tint. The principal constituent of the root bark was found to be a glucoside  $C_{21}H_{20}O_{10}$ , which the author has named.

*Cuspidatin*. It crystallizes in lustrous yellow needles, which melt at  $202^{\circ}$ – $203^{\circ}$ , and on hydrolysis yields 61.82 per cent. of a product which the author recognized to be *emodin*. This glucoside differs considerably in proportion from frangulin, the glucoside of emodin contained in the bark of *Rhamnus frangula*.

The root bark also contained a second glucoside, which was obtained in too small quantity for analysis. On hydrolysis it yielded a crystalline substance melting at  $199^{\circ}$ , which by treatment with sulphuric acid at  $160^{\circ}$  was converted into emodin. It was found to be identical with the *emodin monomethylether* previously isolated from the root bark of *Ventilago madraspatamæ*. Other constituents were a small amount of free emodin and a wax which crystallized in colorless leaflets melting at  $134^{\circ}$ – $135^{\circ}$ .—Chem. News, Dec. 6, 1895, 278; from Proc. Chem. Soc. Nov. 7, 1895.

In continuation of his inspection of *Polygonum cuspidatum*, Mr. Perkin has examined the roots of plants that were grown near Leeds, his examination being confined to the "root-bark" because the woody portion of the root contained but little extractive matter. The author succeeded in isolating a new glucoside, for which he proposes the name

*Polygonin*.—As obtained by the method described, it consisted of a glistening mass of orange-yellow needles, which, when heated, softened at  $200^{\circ}$  and melted at  $202^{\circ}$ – $203^{\circ}$ . From its solution in boiling alcohol, in which it is but sparingly soluble, it is deposited in a gelatinous condition if

rapidly cooled, but when left to cool slowly it separates as a bulky mass of hair-like needles. Analysis leads to the formula  $C_{21}H_{20}O_{10}$ . It is almost insoluble in ether, and only sparingly dissolved by ethylic acetate and by boiling water. It dissolves in cold dilute alkalies or baryta water, forming orange-yellow liquids, and with alcoholic potash yields a potassium compound, which was obtained by the author in the form of red, flat, microscopic needles. By hydrolysis it is split into emodin and a glucose. The root bark also contains free

*Emodin*, an *Emodin Monomethyl Ether* and a *Wax* ( $C_{18}H_{28}O$ ). The latter product consisted of beautiful colorless leaflets, which resembled phenanthrene in appearance, melted at  $134^{\circ}$ - $135^{\circ}$ , and appeared to be identical with the wax existing in the root bark of *Morinda umbellata*. In containing emodin, the root of *P. cuspidatum* shows a chemical relation with rhubarb root, and with the bark of *Rhamnus frangula* in containing emodin-methyl-ether. The latter, as is known, contains frangulin, which by hydrolysis also yields emodin, but is nevertheless not identical, since it is split into emodin and rhamnose, and differs in composition, crystalline appearance, solubility, and other properties from polygonin.—Journ. Chem. Soc., Dec. 1895, 1084-1090.

*Rhubarb—Chemistry.*—Dr. Oswald Hesse communicates the results of some highly interesting investigations respecting the chemistry of rhubarb, from which it appears that the activity of rhubarb upon the intestinal canal is represented almost wholly in an amorphous resinous substance, whilst the crystalline principles with which it is associated are devoid of such activity. These crystalline principles are *chrysophanic acid*, *emodin*, and a new substance, *rhein*, and form the subject of the author's present investigation. They were obtained from Chinese rhubarb by exhausting the finely powdered drug by repeated digestions for ten days with five times its weight of ether, distilling the ether from the decanted liquid, and using the distillate for the next digestion, until, in the course of three months, ten portions of extract had been obtained. The united ether extract assumed a crystalline condition on cooling. Treatment of this extract with cold 80 per cent. alcohol resulted in a dark brown solution, and a pulverulent residue of crystalline substance. Upon spontaneous evaporation of the solution a further quantity of crystals separated in the amorphous residue, and by treating this residue with weak alcohol, a solution was obtained which on evaporation left a perfectly amorphous residue, and contained almost the whole of the active constituents of the drug.

The crystalline residue separated from the extract was repeatedly treated with dilute solution of potassium carbonate at a temperature of about  $40^{\circ}\text{C}$ . in a vessel from which air was excluded, until a solution was eventually obtained which did not become sensibly red-colored within twenty-four hours. The alkaline solution contained the emodin and rhein; the undissolved residue was composed of nearly pure

*Chrysophanic Acid* ( $C_{15}H_{10}O_4$ ), which was obtained perfectly pure by recrystallization from alcohol or glacial acetic acid until the melting point of the crystals was  $178^{\circ}C$ . It then forms golden-yellow laminæ, resembling moss in their arrangement; is quite insoluble in watery solution of potassium or sodium carbonates at the normal temperature, but a little is dissolved at a boiling temperature, probably undergoing partial decomposition, for a permanent red solution remains, due to the probable formation of emodin.

*Emodin* ( $C_{15}H_{10}O_5$ ) is obtained by acidifying the alkaline solution obtained as before described, and shaking it out with ether. The residue of evaporation from this contains both the emodin and rheïn, and these are evaporated by treatment with boiling toluene, which dissolves the emodin and leaves the rheïn as residue. The emodin crystallizes from its solution in boiling toluene on cooling, and is purified by crystallization from glacial acetic acid to which boiling water has been added until crystallization begins. It is thus obtained in form of well-defined orange colored prisms, containing one molecule of water, which is given off at  $120^{\circ}C$ ., leaving anhydrous emodin in the form of dull crystals, and melting at  $250^{\circ}C$ . It is freely soluble in alcohol, and the solution has an acid reaction. It dissolves in cold watery solutions of alkali carbonates, as well as in caustic alkalies, with a purple-red color.

*Rheïn*,  $C_{15}H_{10}O_6$ , which remains as residue when the ether extract from the alkaline solution has been extracted by boiling toluene, is purified by recrystallization from hot glacial acetic acid. It forms microscopic yellowish brown scales, is insoluble in water, almost insoluble in toluene, benzene, ether, or cold glacial acetic acid, and but sparingly soluble in alcohol, and in boiling glacial acetic acid. Its alcoholic solution is distinctly acid, and it dissolves readily in watery solutions of alkalies and their carbonates at the normal temperature, producing deep-purple red solutions.

In a former paper the author had pointed out that the chrysophanic acid of *Physcia parietina* which had long been held to be identical with the chrysophanic acid of rhubarb, was a distinct substance, which he described under the name of *phycion*, and as having the composition of  $C_{16}H_{12}O_5$ . His present experiments confirm for the chrysophanic acid of rhubarb, the formula of Liebermann and O. Fischer, viz.,  $C_{15}H_{10}O_4$ , and he proposes to retain for it the name "chrysophanic acid," notwithstanding that the term is incorrect, since it does not possess the character of an acid. He furthermore considers it probable that the three crystalline substances of rhubarb originate from a still unknown constituent of rhubarb by oxidation, the relation which they bear to each other being represented by the following formulæ :

Chrysophanic Acid.....	$C_{15}H_8O_4(OH)_2$
Emodin .....	$C_{15}H_7O_5(OH)_3$
Rheïn .....	$C_{15}H_6O_6(OH)_4$

Indeed, Proctor considers there is reason for believing that after extracting rhubarb by means of benzene, chrysophanic acid is again formed on exposing the exhausted residue to the action of the air.—Pharm. Journ., Oct. 19, 1895, 225-327.

*Rumex Nepalensis*, Wall—*Constituents*.—The roots of *Rumex nepalensis*, Wall, are largely employed in Madras and other parts of India for medicinal purposes and for dyeing. Mr. D. Hooper was of the opinion that they contain chrysophanic acid, but after Dr. O. Hesse had shown that the chrysophanic acid of *Parmelia parietina* is a substance different from that contained in rhubarb, he supplied Dr. Hesse with a quantity of the material for the purpose of investigation. Hesse now reports that the substance present in these roots is not the chrysophanic acid of the rhubarb, but a substance closely analogous to it, for which he proposes the name "rumicin," and that it is associated with two other substances, which he names respectively "nepalin" and "nepodin." A brief account of the method of extraction and purification of these solutions is given, together with their characters of distinction.

*Rumicin* has the form of yellow laminar crystals of metallic lustre; it dissolves readily in hot alcohol, acetone, or glacial acetic acid, slightly at the ordinary temperature, readily in chloroform, and scarcely at all in petroleum spirit; gives a faint rose-color with a solution of potassium carbonate, a purple-red with potassium hydrate, and dissolves in concentrated sulphuric acid from which it is deposited by the addition of water unaltered in yellow flocks. It melts at 186°-188° C., and has a composition corresponding to the formula  $C_{15}H_{10}O_4$ . Heated with hydriodic acid it produces a substance identical with that produced under the same conditions from chrysophanic acid—"chrysophan-anhydanthron"—and appears, in fact, to differ from chrysophanic acid only in its melting point.

*Nepalin* forms orange colored microscopic crystals, melting at 136° C. to a red liquid; it is not soluble, does not contain water of crystallization, and has a composition leading to the formula  $C_{17}H_{14}O_4$ .

*Nepodin* crystallizes in long greenish-yellow prisms melting at 158° C. Its composition is represented by the formula  $C_{18}H_{16}O_4$ .

The authors' results show that *Rumex nepalensis* contains substances quite different from those existing in the allied species of *Rheum* from which rhubarb is derived, viz., chrysophanic acid,  $C_{15}H_{10}O_4$ ; emodin,  $C_{15}H_{10}O_5$ ; and rhein,  $C_{15}H_{10}O_6$ ; and he considers the opinion that the rumicin obtained from the other varieties of *Rumex* is identical with chrysophanic acid to be without sufficient foundation. The circumstance that rumicin and chrysophanic acid yield the same product on treatment with hydriodic acid requires further investigation.—Pharm. Journ., June 6, 1896, 441; from Annal. der Chem. 291, 306.

## SCROPHULARIACEÆ.

*Scrophularia Nodosa*, L.—*Occurrence of Beautiful Sphæro-Crystals in the Green Parts of the Plant*.—Dr. August E. Vogl gives an interesting description of the occurrence of unusually beautiful sphæro-crystals of an organic compound in all the green parts of the knotty figwort, which are specially interesting on account of their being present in the living plant itself, and not produced by drying or by the action of certain reagents. They resemble in many respects the sphæro-crystals found in buchu leaves, in the leaves of *Conium maculatum*, and other umbelliferous plants, and considered to be hesperidin. They are most easily seen in the stem-leaves, the structure of which is given in brief detail, accompanied by a number of cuts exhibiting the distribution of the sphaero-crystals in the leaves, carpels and stem of the plant. So far as the author's present investigations extend, the sphaero-crystals described by him are of regular occurrence in *Scrophularia nodosa*; he has examined plants from varied localities and has never failed to detect them, although sometimes but few were to be found. They often occurred, however, in considerable number; and in some specimens, gathered in a vineyard after flowering, every epidermal and mesophyll cell contained a sphaero grain. The author also calls attention to the extremely elegant capitate hairs in the flowering stem and its branches; they are accompanied by small capitate hairs, and consist of a pedicel composed of two cells of unequal size bearing a compound hemispherical, or almost disc-shaped head, which, seen from the side, appears lens-shaped.—Pharm. Journ., Febr. 8, 1896, 101-103.

*Scrophularia Nodosa*—*Toxity*.—Van der Moer finds that aqueous and alcoholic extracts of *Scrophularia nodosa* are toxic. Injection of aqueous solutions of such extracts rapidly produced paralytic reaction in frogs, the special symptoms being preceded by a brief period of excitation. The author has obtained from the purified alcoholic extract a yellow amorphous substance, the properties of which resemble the poisons obtained from digitalis.—Pharm. Journ., May 30, 1896, 423; from Nederl. Tydschr. v. Pharm.

## SOLANACEÆ.

*Solanum Carolinense*—*Value in the Treatment of Epilepsy*.—Dr. Charles S. Potts summarizes his conclusions respecting the use and value of *Solanum Carolinense* in the treatment of epilepsy as follows: 1. The drug has a decided influence for good upon the epileptic paroxysm. 2. This influence is probably not so great or so sure as that obtained by the use of antipyrine and the bromides. 3. In those cases in which it is of service, it relieves the paroxysms without causing other unpleasant symptoms, such as are sometimes caused by the use of large doses of the bromides. 4. The dose ordinarily recommended (10 to 15 drops of the fluid extract) is too small; as much as a teaspoonful or more, four times a day, is often needed

to secure results.—*Amer. Jour. Pharm.*, May, 1896, 268; from *Therap. Gaz.*, Dec. 16, 1895.

*Potatoes—Influence of Varying Conditions on the Amount of Solanine.*—Klepzow has determined solanine in the tubers, the sprouts and the peels, at different periods and under varying conditions. The peeled potato gave no solanine reaction in November, but having been caused to sprout artificially, it contained in December 0.11 per cent. in peels, 0.19 per cent. in sprouts, and gave a faint reaction in the interior substance of the tubers. The quantity of solanine is so insignificant that poisonous effect from the use of potatoes as a food is out of question.—*Pharm. Centralh.*, Nov. 28, 1895, 693.

*Tobacco—Cultivated in Australia.*—The "Bombay Gazette" points out that Australia threatens to compete with India as a tobacco producing country, active measures being taken at the present time with the view to the development of the industry. Experimental quantities of tobacco have been grown for a considerable period, and the Melbourne Agricultural Department is of opinion that a highly profitable business may be built up. An American expert, however, reports that greater care in growing, curing, and grading the tobacco, than is now the practice, will be necessary to make the plantation repay cultivation.—*Pharm. Jour.*, May 23, 1896, 463.

*Tobacco—Cultivation in India.*—The British Consul at Naples says that a good deal of tobacco is grown in the Southern Italy, but growers are very much hampered in their operations by the excise officers, who count not only every plant, but every leaf. Steps are taken by the government to extend the culture of tobacco in the Nocera district, and a school to give theoretical as well as practical instruction in the cultivation of tobacco is shortly to be established at Nocera. It is to be hoped, says the Consul, that the instructions given there may enable Italy to provide her sons (and daughters) with a less evil-smelling weed than they are compelled by their paternal government to consume at present.—*Pharm. Journ.*, May 30, 1896, 423.

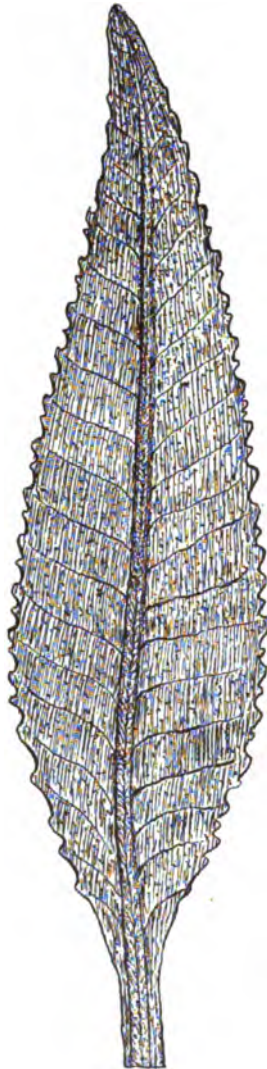
#### HYDROPHYLLACEÆ.

*Eriodictyon Glutinosa*—*Microscopic Structure of the Leaves.*—F. W. Ritter, after giving a version of the general character and uses of "Yerba Santa," gives a very complete description of the macroscopical and microscopical characters of the leaf, the structure of which is indicated in the accompanying cuts. Fig. 42, the upper surface of the leaf, twice the natural size. Fig. 43, the lower surface of the leaf, also twice the natural size. Fig. 44, a transverse section of the petiole, magnified 30 diameters: *a*, the epidermis of the petiole, composed of a single layer of cells which are thickened and slightly cutinized upon their exterior surface, and pre-



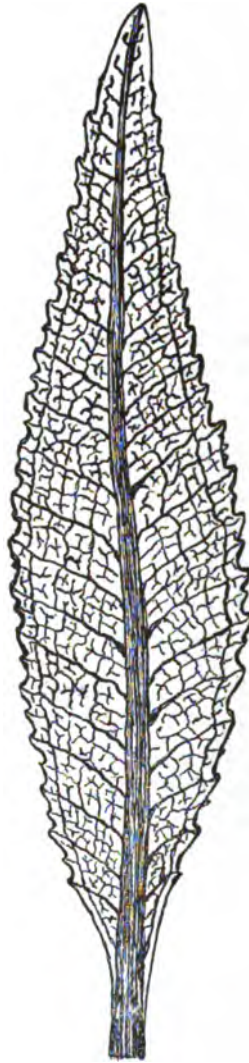
senting a fringed appearance ; *b*, several layers of collenchyma or thick angled cells underlying the epidermis ; *c*, intercellular spaces in the parenchyma ; *d*, parenchyma tissue surrounding the vascular bundle ; *e*, crystals of

FIG. 42.



Upper Surface of Leaf,  
Twice natural size.

FIG. 43.

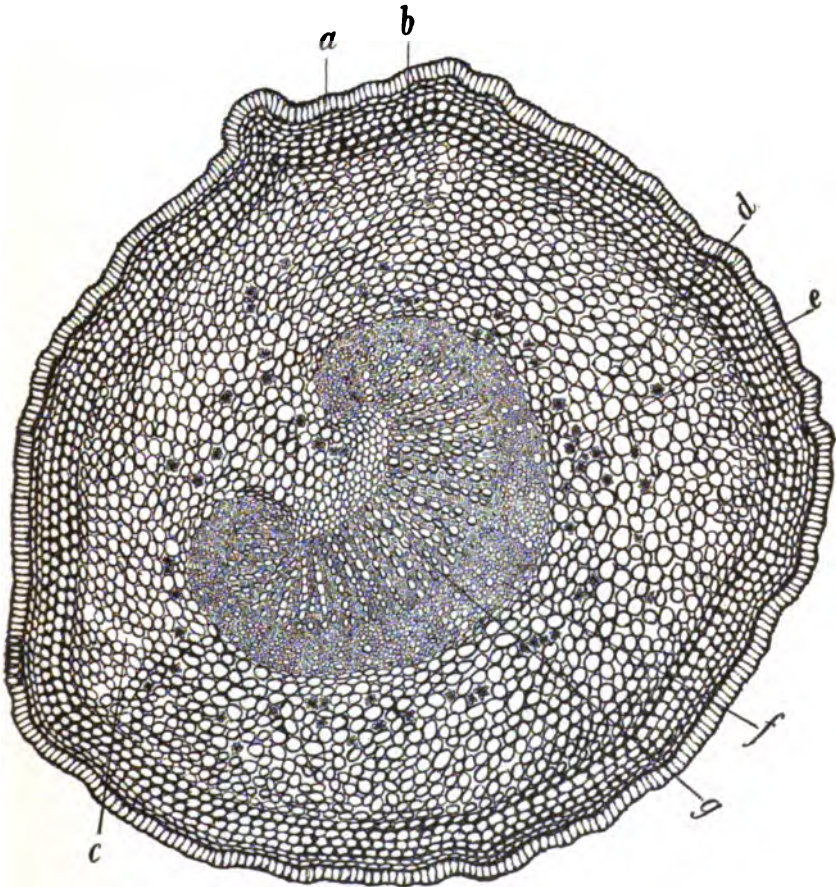


Lower Surface of Leaf,  
Twice natural size.

calcium oxalate in the parenchyma cells closely encircling the vascular bundle ;  
*f*, phloem portion of the vascular bundle facing the lower surface of the leaf ;

*g*, xylem portion of vascular bundle, showing the radial arrangement of ducts. Fig. 45, a transverse section of a portion of lamina adjoining midrib, magnified 50 diameters; *a*, epidermal cells arranged in a single layer, cells very thick-walled; *b*, layers of palisade parenchyma composed of rows of cells and containing crystals of calcium oxalate; *c*, spongy parenchyma adjoining lower epidermis of leaf; *d*, transverse sec-

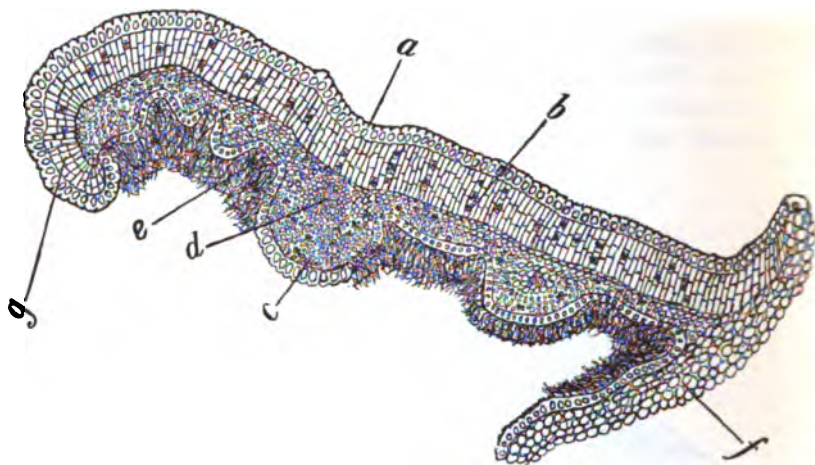
FIG. 44.



**Transverse Section of the Petiole, Magnified 30 Diameters.**

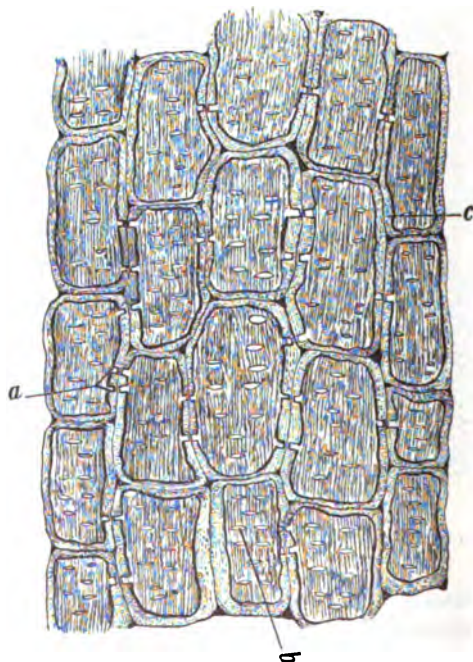
tion through lateral vein, showing small vascular bundle; *e*, long, matted hairs upon lower surface; *f*, portion of adjoining midrib; *g*, slightly revolute margin. Fig. 46, a longitudinal section of parenchyma cells of midrib, magnified 250 diameters; *a*, pit in parenchyma cells as seen in section; *b*, pits in parenchyma cells face view, longitudinal section of

FIG. 45.



Transverse Section of a Portion of Lamina Adjoining Midrib, Magnified 50 Diameters.

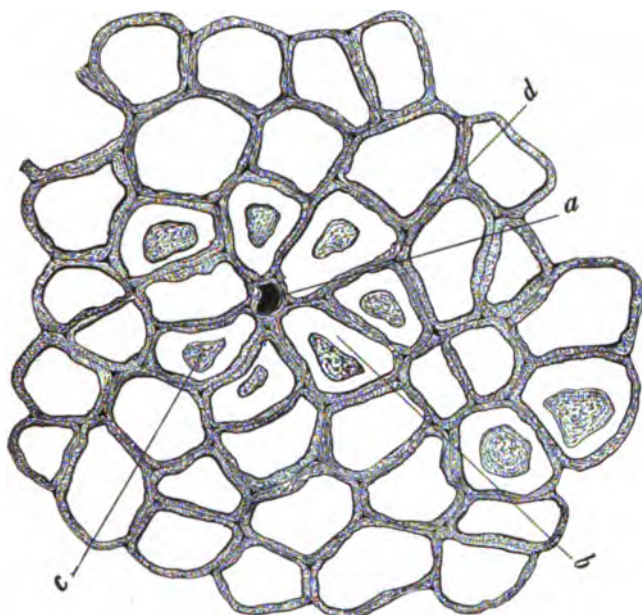
FIG. 46.



Longitudinal Section of Parenchyma Cells of Midrib, Magnified 250 Diameters.

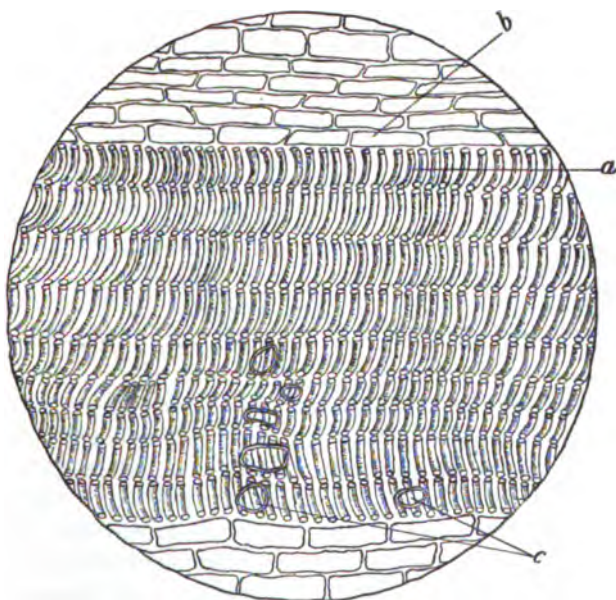


FIG. 47.



Small Portion of the Upper Epidermis Magnified 250 Diameters.

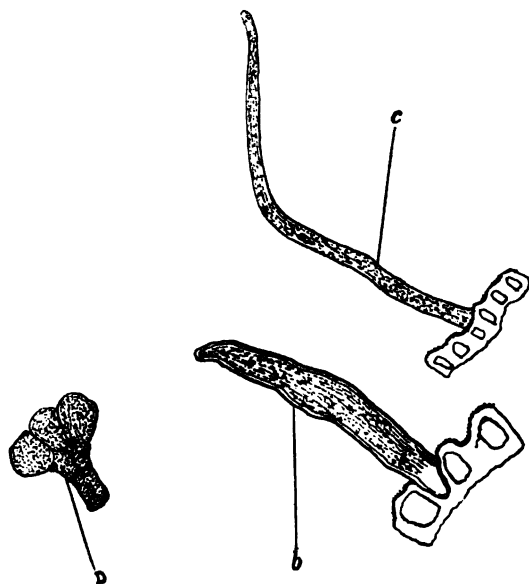
FIG. 48.



Longitudinal Section Through the Midrib.

cells; *c*, middle lamella. Fig. 47, a small portion of the upper epidermis magnified 250 diameters; *a*, base of long woolly hair; *b*, ?; *c*, cell contents shrunken from walls, due to treatment with alcohol; *d*, middle lamella. Fig. 48, a longitudinal section through the midrib: *a*, ducts of the vascular bundle, showing spirals; *b*, adjoining phloem tissue in longitudinal section; *c*, ends of ducts as seen when focus is slightly changed. Fig. 49, various forms of hairs from the leaf, magnified 250

FIG. 49.



Various Forms of Hairs from the Leaf, Magnified 250 Diameters.

diameters; *a*, short multicellular glandular hair found upon upper surface of blade and also upon midrib; *b*, an unusual form of hair observed upon the petiole; *c*, one of the long woolly hairs which abound upon the lower surface of the leaf, and which give to it its characteristic whitish appearance.—*Amer. Jour. Pharm.*, Nov., 1895, 565-572.

## OLEACEÆ.

*Olive Oil—Process of Preparation at San Remo.*—A correspondent of the "Chemist and Druggist" (Aug. 31, 1895, 358-359) gives some information respecting the cultivation of the olive tree and the preparation of olive oil at San Remo, in the Riviera Torrente. The fruit is ripe and ready for collection in February or March. Sheets are spread upon the ground beneath the trees, and the branches beaten until the fruit falls. The olives are placed whole into the mill—which is often a long distance from the orchard—and are ground for several hours, when they are packed into

peculiarly shaped fibre bags, resembling Tam O'Shanter caps, but about twice the size of them, and, being placed one on top of the other to a height of about three feet, they are put under a huge pan and gradually pressed until no more oil exudes. The oil obtained is first purified by throwing cold water upon it, which in descending carries down the coloring matter and impurities, and it is then run off into casks or troughs, in which it is allowed to stand till all sediment is deposited. It is then sold to dealers, who frequently again refine the oil by filtering, and export it in flasks or casks. This is the finest quality of oil, a very inferior grade being obtained from the marc by again placing it in the mill, and well washing it by passing a stream of water through it. The seeds remain at the bottom, while the husks pass away with the surplus water into a succession of troughs, when they are collected and repressed. The product of the second expression is generally used for burning purposes, or for soap making. The now almost dry husks are employed for feeding cattle, whilst the crushed seeds find ready sale to bakers for heating ovens, these two by-products being sufficiently remunerative to be received as payment by the mill owner for expressing the oil. An inferior oil is made from the half ripe olives which have fallen.

*Manna—Purification.*—A writer in "Pharm. General. Anz." states that manna may be purified by treating its solution with animal charcoal, the solution having first been clarified by skimming and filtering. The purified solution is then evaporated to a thick consistence, and poured into moulds or spread out on plates and allowed to dry. Very attractive forms may be made by using moulds obtained by dissolving the soft part of cuttle-fish bones by laying them in very dilute hydrochloric acid.—Amer. Drug., April 10, 1896, 215.

#### VERBENACEÆ.

*Latana—Anti-malarial Properties.*—Lugo Vina draws attention to the anti-malarial properties of *Latana*, a plant known under the name of "Sacred Herb," and esteemed by the inhabitants of Brazil, La Plata and Peru on account of its remedial value. It has been successfully administered in acute articular rheumatism and in typhoid fever by Buiza, of Lima, who has recently also experimented with the alkaloidal constituent of the plant,

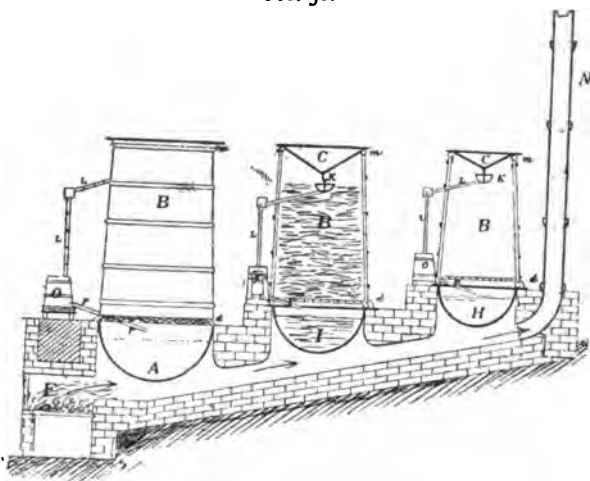
*Lantanine*, isolated by Negrete. He administered this new alkaloid to thirty-two patients attacked with fever of different character and intensity, with equally good results. Like quinine, it produces a moderate effect on the circulation, determining a retardation of the chemical phenomena of nutrition and a diminution of temperature. It is superior to salts of quinine, as it is tolerated by the most delicate patients, and in larger doses it is a powerful antiperiodic. The dose is from 1 to 2 grammes during a day, given in divided doses (20 centigrammes) every two hours.—Pharm.

Jour., Nov. 2, 1895, 365; from Rev. de Ciencias Medicas, through Br. Med. Jour., Oct. 5, 1895, 56.

#### LABIATÆ.

*Peppermint—Distillation of Oil as Practiced in Japan.*—E. Marx describes the method of distilling oil of peppermint in Japan, which does not yet appear to have been improved upon by the introduction of European methods. The apparatus universally adopted in Japan is shown by the accompanying cuts, Fig. 50 being a view in elevation and Fig. 51 showing the ground plan. It consists of three cast-iron boilers, *A*, *I*, *H*, which

FIG. 50.

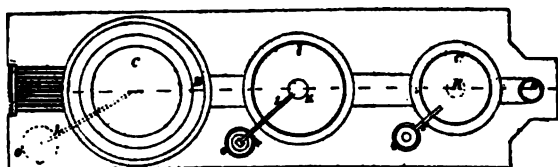


View in Elevation.

are surmounted by the wooden vats *B*, and then by the condenser *C*, the three stills constituting one battery with a common furnace, and arranged in steps, so that the lowest is built into the ground. The boilers *A*, *I*, *H*, being filled with water, the vats *B*, which have perforated bottoms, are placed upon the broad edges of the boilers and surrounded with straw bands and soft clay. The peppermint is placed into them, the inverted condensers *C* are put on, filled with cold water, and the furnace fire, *F*, is lighted, the heat passing beneath the boilers *A*, *I*, *H* and finally into the chimney *N*. The boiler *H* being smaller than *I*, and *I* smaller than *A*, the herb is thus equally distributed, and distillation begins. The steam, penetrating the herb carries with it the essential oil, which condenses on the surface of the condenser *C*, whence it drops into the vessel *K* suspended immediately beneath the cone, and is carried through a bamboo reed into the receiver *O*. The oil collects in these upon the surface, whilst the condensed water flows back into the boilers. The water in the condensers is renewed with the aid of a bamboo syphon by the workmen from time to

time as it becomes heated, but this part of the process is quite frequently neglected, and consequently there is much waste by uncondensed vapors of oil and water passing into the air. In addition to the direct loss by this negligence, it often happens that the water-boiler becomes dry, and

FIG. 51.



Ground Plan.

then the herb in the still is burnt in spite of the straw. This explains why Japanese oil of peppermint has a peculiar empyreumatic odor.—Chem. and Drugg., April 25, 1896, 601.

*Mentha Piperita*.—*Distinction between the Essential Oils of the Black and White Variety*.—John C. Umney gives the details of experiments made to distinguish between the essential oils of black and white peppermint. The two varieties of the plant (*Mentha piperita*) grown in and about Mitcham are known as black and white peppermint respectively, but the two plants are botanically identical, though the difference between the appearance and habit of the two is sufficiently marked to make characterization quite distinctive. The black peppermint herb has purple stems, dark green leaves not deeply serrated, and rarely flowers in England. The white peppermint possesses more lanceolate, brighter green leaves than the black variety, the margin being much more deeply serrated, and the stems are green. The preference is given by growers to the black, because the plant is more hardy than the white variety, and the yield of essential oil is considerably greater, being as much as 8 lbs. per ton of fresh herb, while the latter rarely yields more than 6 lbs., and usually not more than 3 or 4 lbs. per ton. The distinction in the odor of the two oils consists in the well-known pungency of that of the black, being agreeably toned down in that of the white variety by a pleasant smell not easily described. The principal physical and chemical characters by which the white oil of peppermint may be distinguished from the black are summarized by the author as follows :

1. In having greater optical activity.
2. In not depositing menthol at a low temperature, possibly owing to the fact that a portion of the menthol present exists in a modified liquid form.
3. In containing a greater proportion of esters of menthol (acetic and isovalerianic).
4. In giving intense blue coloration with copper fluorescence, with



glacial acetic acid, and the other reactions of the United States Pharmacopœia.

It seems certain that the variation in the aroma of the two oils is dependent upon one, if not more, well-defined differences pointed out in the constitution of the respective oils.—Pharm. Journ., Febr. 15, 1896, 123-125.

FIG. 52.



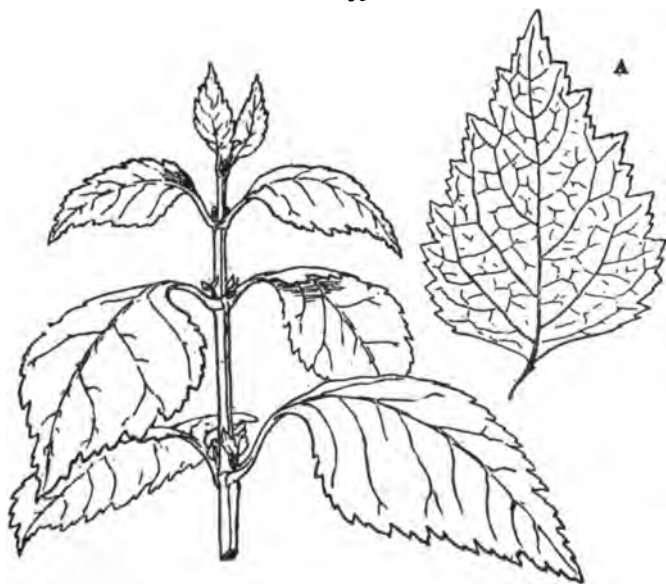
Patchouli Plant—Flowering Variety.

*Javanese Patchouli—Botanical Source, etc.*—J. Ch. Sawer calls atten-

tion to two distinct varieties of patchouli leaves which are grown in Java, and which are now rapidly coming into use in Europe under the name of

*Dilem*, a word which, however, is not a pure local word in Java, but is a common Malay word that has been in use in the Straits Settlements to designate the ordinary patchouli produced in those districts. The plants yielding these two varieties of patchouli leaves consist of a flowering variety and a non-flowering variety, shown in the accompanying cuts (Figs. 52 and 53), from drawings made by the author, and they have been submitted to Mr. E. M. Holmes for identification. Mr. Sawyer observes that the oils from these two plants differ from each other very considerably in odor, and also from the Malay patchouli oil. The odors of both are

FIG. 53.



Patchouli Plant—Non-Flowering Variety.

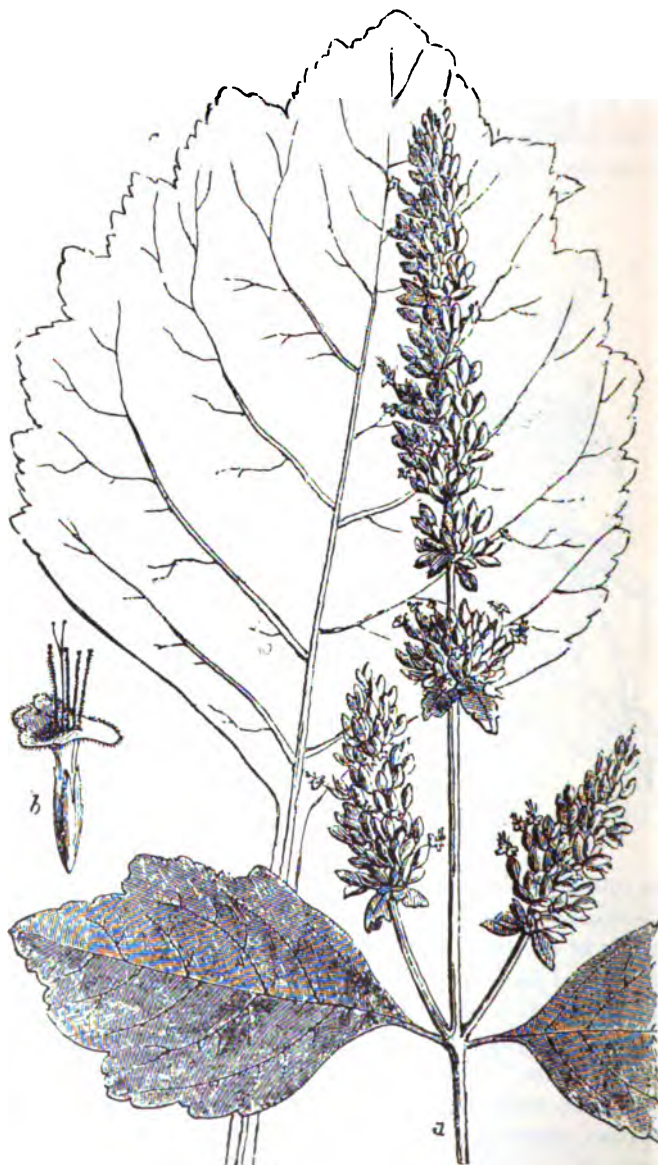
intensely powerful and persistent, so much so that after sniffing one of them, the second cannot be fairly appreciated if smelt at once; and if the least particle of oil should come into contact with a hair in the nostrils, that nose is good for nothing during the rest of the day. In testing the odors of such oils it is best, therefore, to smell them in a diluted state.

In a comparison paper, E. M. Holmes, after confirming the application of the word "*dilem*" to designate various plants belonging to the genus *Pogostemon* (the name "*dilem*," or "*nilam*," being also applied to *Coleus atropurpureus*, Benth.), observes that according to Miguel no less than nine species of

*Pogostemon* are known to occur in Java, viz., *P. patchouli*, Pell. (culti-

vated) ; *P. heyneanus*, Benth. ; *P. plectranthoides*, Desf. ; *P. gracilis*, Hassk. ; *P. cristatus*, Hassk. ; *P. tomentosus*, Hassk. ; *P. comosus*, Mig. ; *P. menthoides*, Bl. ; and *P. fraternus*, Mig. A comparison of the description of

FIG. 54.

**Pogostemon Patchouli.**

these plants with the flowering plants from Mr. Sawyer led him to express the opinion that it is identical with the

*Pogostemon comosus* of Miguel, and that this plant is the "dilem" used by German manufacturers of essential oils. As to the non-flowering plant from Java, this cannot at present be identified. It differs from

*Pogostemon patchouli*, Pell. (see Fig. 54) in its acute, almost acuminate, sharply serrated leaves and less tapering base, but agrees with it in the character of the densely crowded erecto-patent white hairs, which mark out the lateral veins like white lines. *P. patchouli*, which is known to be cultivated in Java, is a very shy flowerer, and in an instance cited a plant has been known to show no disposition to flower during ten years. It was first correctly described by Dr. Pelletier-Sautelet, and is easily distinguished from *P. heyneanus* by its stouter, broader leaves, obtusely crenate-serrate, and by the lateral veins being hidden by a dense coating of slightly erecto-patent, not appressed, white hairs, so that the veins look like white lines. The plant is certainly cultivated at Penang and in Java as well as in India, and neither it, nor *P. heyneanus*, Benth., nor *P. comosus*, Mig., can possibly be confounded with the patchouli plant of Khasia and Assam, which formerly placed under the genus *Plectranthus* as *P. patchouli*, Clarke, is now placed under the new genus *Microtena* as *M. cymosa*, Prain. This has cordate-ovate, acuminate, crenate-serrate leaves, with scattered spreading hairs and flowers, in which the upper lip is hooded almost as in *Scutellaria*, while the inflorescence forms a loosely-panicled cyme.—Pharm. Journ., Mar. 21, 1896, 221-224.

#### BORRAGINÆ.

*Alkanet—A New Commercial Variety.*—M. Vogtherr reviews the different varieties of alkanet and allied plants containing similar red coloring matter, and describes a new commercial variety which under the name of "Syrian alkanet" bids fair to become a strong competitor, if it will not eventually replace "Hungarian alkanet," derived from

*Alkanna tinctoria*, Tausch. (*Anchusa tinctoria*, L.)—This drug consists of the entire root, but the coloring matter is contained in the fibrous cortex, which readily detaches itself from the ligneous portion, and the drug is therefore liable to vary in its value in the degree in which the cortex has been lost or wasted. While indigenous to Asia Minor, it is cultivated in Hungary. It contains from 5.5 to 6.2 per cent. alkannin.

*Alkanna Syriaca*, Briss. and Hch. (not the Syrian alkanet above referred to), is found on the Euphrates. The plant is larger than *A. tinctoria*, but the root contains much less alkannin.

*Alkanna Cappadocia*, Boiss. and Bet., grows in Cappadocia and Eastern Asia Minor. It contains even less alkannin than the last mentioned species; and

*Alkanna Orientalis*, L., indigenous to Asia, contains none at all.

According to Nees v. Esenbeck and numerous other authors, among them, Dorvault,

*Onosma Echinoides*, L., cultivated in Southern France, is used in place of alkanet in that locality. But Haussknecht, who has seen this plant in different localities, as well as Karsten, state that its root does not contain a red coloring matter. Moreover, the plant drawn by Nees v. Esenbeck is characterized by a thick spindle-shaped root, which does not resemble that of *Onosma*, but has great similarity with the root of

*Macrotomia cephalotes*, D. C. This plant abounds in northern Asia Minor, Armenia, and the Trans-Caucasus, and there is no doubt that it is the source of the drug recently introduced as

*Syrian Alkanet*, from Aleppo and Syrian ports. It occurs in roots of various dimensions, some as long as 40 to 50 Cm., with a diameter of 5 Cm.; others, from 10 to 20 Cm. long and 1 to 1½ in diameter. The root is many-headed, the heads being surrounded with violet-gray bristly hairs, which are situated on the apex of the outer cuticle; and bunches of leaves are not infrequently found on these root heads. The root itself descends, is spirally contorted toward the point, and ends in a more or less horizontal direction. It is black, violet and resinous-metallic glistening in appearance, and has a faint odor resembling that of logwood ink. It contained, in the specimens examined, 19.13 per cent. of a red coloring matter, which appears to be identical with that of alkanet. The paper is illustrated by a number of cuts, showing its histological characters, for which, and the nearer description, reference must be had to Pharm. Centralh., March 12, 1896, 148-152.

#### CONVOLVULACEÆ.

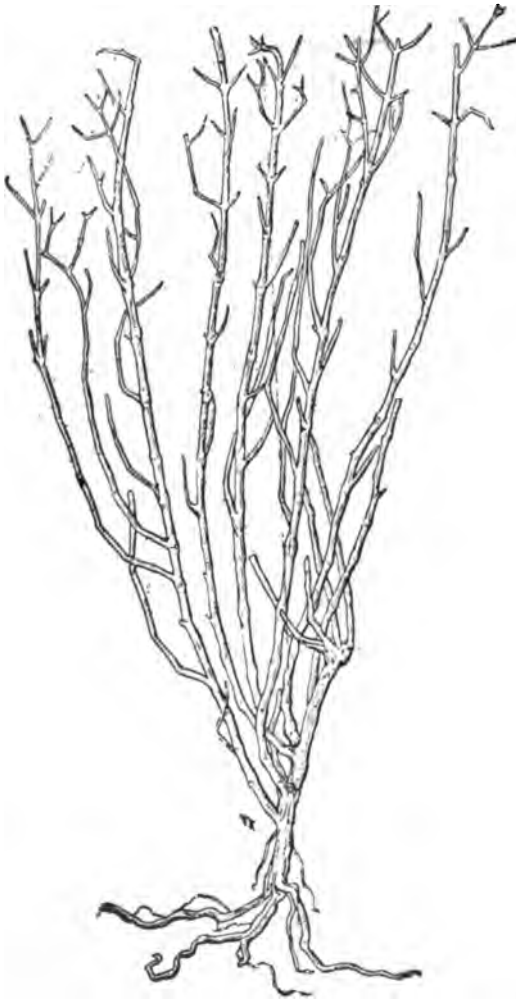
*Jalap—Cultivation in India.*—The "British and Colonial Druggist," after giving a description of the sources, cultivation, character, substitutions, and commerce of Mexican Jalap, which adds little to what is to be found in text-books, gives an account of jalap cultivation in India. The experience gained in jalap cultivation in Madras has shown that the plants required a rich, loamy soil, and the best is well drained grass land, laid out in terraces about 10 feet wide; this must be dug over and allowed to lie exposed to the sun for about two months, then drilled and manured and planted with potatoes. These must be lifted and jalap tubers planted in rows a few inches high to prevent the water from becoming stagnant around them; when the plant has become established, ordinary culture is all that is necessary. Planted in this way 1 acre has yielded 5,000 pounds of green tubers at the end of three years; these, properly dried, produce 1,000 pounds of jalap powder. A trial was made in this way some few years ago. Five acres of the land were thus planted; the crop yielded 3,000 pounds of green tubers, producing 1,077 pounds of cured jalap. When it is considered that about 180,000 pounds of jalap finds its way

into English markets annually from Vera Cruz, the importance of its successful culture becomes evident.—*Amer. Drugg.*, Feb. 25, 1896, 127.

## GENTIANACEÆ.

*False Chiretta—Occurrence in the London Market.*—J. S. Ward calls attention to a false chiretta recently offered for sale by a broker, but which,

FIG. 55.

**False Chiretta.**

from its characteristic appearance, could not be mistaken for the genuine. The loose bundles not press packed, arranged in series, suggested at a short distance when in bulk, both in color and appearance, a parcel of re-

cently dried broom-tops. Each plant (See Fig. 55) was complete, root and stem being perfect; the branches were slightly broken, the leaves mostly absent, intermixed were some extremely slender stems, panicles of pedicellate flowers, corolla and calyx, and glandular hairs. The few leaves found were slender and much broken; the branching stems are from  $\frac{1}{8}$  to  $\frac{1}{4}$  inch in thickness near the base, woody, quadrangular, furrowed, smooth, and slightly knotted at the point from which the branches spring; the longitudinal furrows are continued through the roots, which are numerous fine radicles; the leaves are opposite, decussate, branches erect, or forming an acute angle with the stem, terminal shoots extremely slender. The whole is a little more than 2 feet in length, and the plant agrees with the description of

*Audrographis paniculata*, Nees, given in the "Pharmacographia" and the "Pharmacographia of India," and also with the specimen in the Museum of the Pharmaceutical Society. *Audrographis* is not an article of commerce but the fresh plant is sold by herbalists and gardeners in India. The author suggests that this importation may have been made simply to test its value, rather than with the intention of passing it off as chiretta; but, while it is not as nauseous as chiretta, the choice of pure bitter tonics is so large that he does not believe it probable that *Audrographis* will become an addition to the drugs in common use.—Pharm. Jour., Sept. 7, 1895, 197.

*Audrographis paniculata*—*Histological Characters*.—Henry G. Greenish has subjected Mr. Ward's specimen of "false chiretta" to microscopical examination, and communicates his results in a paper accompanied by cuts showing the histological characters of: 1, the cortex of the stem, in transverse section; 2, the epidermis of the stem; 3, the lower epidermis of the leaf; 4, the upper epidermis of the leaf; 5, a transverse section of the leaf; 6, the hairs on the pedicel and sepals of portions of the flower found in the drug; 7, a peculiar two-celled form of gland; and 8, in figures *a*, *b*, *c* and *d*, are shown certain peculiarities of the bark fibres. The paper, naturally, does not admit of condensation, and reference must therefore be had to the original. The characteristic histological features observed in the drug are cited by the author to be the minute crystals of calcium oxalate (in the cortex), the two forms of glandular hairs, the minute bark fibres, and the occurrence of *cystoliths*, which latter have up to the present time been found only in a few natural orders. It is interesting to note, also, that the author observed, though only quite exceptionally, *double* cystoliths, which is contradictory to the observation of Hobein that in the sub-tribes *Audrographideæ*, *Asystasiæ*, and *Pseuderanthemea* alone of the order *Acanthaceæ* the cystoliths are always *single* and mostly rounded.—Pharm. Jour., Nov. 16, 1895, 413-415.

#### APOCYNACEÆ.

*Apocynum androsaemifolium*, Linne—*Substitution by Apocynum Can-*

*nabinum*, Linne.—Clement B. Lowe notes the substitution of the roots of Canadian hemp (*Apocynum Cannabinum*) for those of dogsbane (*Apocynum androsaemifolium*), a substitution which appears to be very prevalent because of the great abundance of the Canadian hemp, which, according to the testimony of a Philadelphia dealer, is sold indiscriminately for either species. Unfortunately the two roots resemble each other so closely that it is difficult to determine between them, by even a careful inspection. A quick examination may however be made by the aid of the microscope. A neat section is made with a pen-knife and the phloro-glucin test is applied when the groups of liquefied stone cells—not bast cells, as described by Manheimer (see Proceedings 1882, 179–180)—will stain red, and be easily recognized by the magnifier.—Amer. Journ. Pharm., April 1896, 193.

*Nux Vomica*—*Modification of Process of Assay*.—C. E. Smith observes that during several years' experience in assaying nux vomica and its preparations, the following method has gradually developed, which he believes has some advantage over others now in use. Its chief recommendations are that accurate results can be obtained without much practice, and that it requires no more time and attention than other methods, which are expected to give only approximate results: Place 10 Gm. of the powdered drug and 100 Cc. of 10 per cent. acetic acid into a bottle provided with a tight stopper, and shake frequently during twelve hours. Filter the solution and wash the residue on the filter with cold water until the washings are tasteless. Evaporate the solution in a shallow vessel on a water-bath to dryness. While still warm, add to the extract 6 Cc. of a mixture consisting of equal volumes of strong alcohol and 10 per cent. ammonia water, and rub them together by means of a rubber-tipped glass rod, until a uniform thick syrup results. Transfer this to a separator containing 40 Cc. of ether and 45 Cc. of chloroform. Wash the extract still remaining in the evaporating dish into the separator with 6 Cc. more of alcohol-ammonia, applying it in three or four successive portions. Cork the separator and shake vigorously for five minutes, then let it stand undisturbed for an hour. Filter the ether-chloroform solution through a small dry filter into a flask of about 200 Cc. capacity, washing the filter at the end with ether-chloroform. Distil off the solvent on a water-bath, dissolve the alkaloids in a little alcohol with aid of heat, and add a few drops of methyl-orange or hæmatoxylin solution. Then dilute with water, and titrate with decinormal acid. The method can be applied in the assay of the galenical preparation of nux vomica as well.—Amer. Jour. Phar., April, 1896, 189–190.

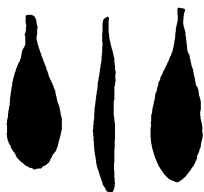
*Strophanthus Seeds*—*Varieties in the American Market*.—Prof. Smith Ely Jelliffe observes that although the seed of *Strophanthus hispidus*, De Candolle alone is official in the United States, it is a well-known fact that more than one kind of seed is found in the market. The genus *Strophan-*



*thus* has about 28 or 30 species, which are found distributed throughout Africa as far as the Cape, and in Asia from the southern portion of India to the Philippine Islands. As far as can be learned at present, the seed of the American market come entirely from Africa, and are represented by six types; but it may be confidently expected that as time goes on more and more of the 28 or more species will find their way into trade, since it is a supposition on the part of the collectors, as pointed out by Mr. Holmes in speaking for the English trade, that all kinds of *strophanthus* possess the same properties, or, on the part of the merchants, that *strophanthus* from any part of Africa would sell. From data at hand it is evident that the seeds that come to the American market are in the main unmixed, the author being able to note only one sample out of thirty in which three distinct seeds were sent as one. Of the six types found in the American market, only four are predominant, viz., *S. hispidus*, D. C., *S. kombé*, Oliver, *S. asper*, Oliver, and *S. gratus*, Wall and Hook., and these are practically narrowed down to three, because the seeds of *S. hispidus* and of *S. kombé* are considered by some writers as varieties of one and the same thing. The three commonly used seeds are described by the author as follows:

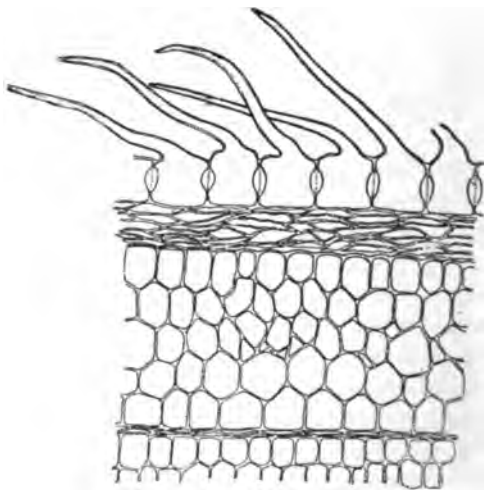
*Strophanthus hispidus* (Fig. 56). The seeds vary from  $\frac{2}{8}$  to  $\frac{3}{4}$  of an inch in length; the variety "kombé" is apt to be longer,  $\frac{3}{4}$  to 1 inch. The color varies considerably. At times it is brownish-white, or brownish-

FIG. 56.



Seeds of the *Strophanthus Hispidus*.

FIG. 57.



Anatomical Structure.

green to greenish-white. Many good seeds are distinctly brown. All are provided with short, stout hairs, pointing upward, which give a shining

appearance to the seed. In the case of the kombé seeds, which are apt to be greener, the sheen is often well marked. In the brown seeds, the sheen is generally sufficient to distinguish them from the brown seeds of *S. gratus*. The seeds are flattened, sharp at the apex where the barb is broken off, and narrowed at the lower end. On the back of the seed a fine ridge may often be seen running from the lower third upward. The anatomical structure is shown in longitudinal section by Fig. 57.

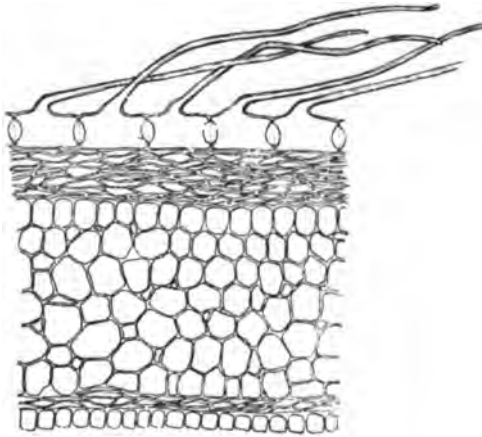
*Strophanthus asper* (Fig. 58). This seed, as found in the market, varies from  $\frac{1}{2}$  to  $\frac{3}{4}$  inch in length. It is oblong and laterally flattened, and is

FIG. 59.

FIG. 58.



Seeds of the *Strophanthus*  
*Asper*.



Anatomical Structure.

### H.T.B

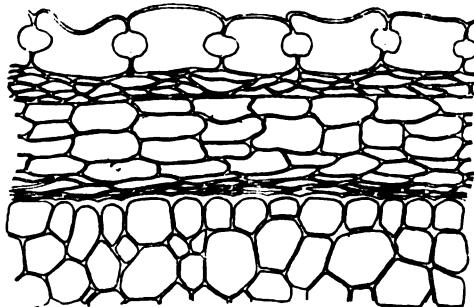
covered by a dense coat of whitish or greenish-white hairs, which double the diameter of the seed proper. Beneath the hairs the seed is light-brown in color. The anatomical structure of this seed is shown in longitudinal section by Fig. 59.

FIG. 61.

FIG. 60.



Seeds of the *Strophanthus*  
*Gratus*.



Anatomical Structure.

*Strophanthus gratus* (Fig. 60). This is the smooth brown seed of the Gabon, varying in length from  $\frac{2}{3}$  to  $\frac{3}{4}$  inch. It is slightly fusiform, flattened and thin. The color is light, sometimes waxy and sometimes dull. The seed is often twisted and shows on its posterior surface a long delicate raphé running from just below the center. The anatomical structure of this seed is shown in longitudinal section by Fig. 61.

For the author's detailed description of the anatomical structure of these several seeds, reference must be had to the original paper in *Drugg. Circ.*, May, 1896, 101-102.

*African India Rubber—Distribution of the Plants yielding it.*—A. De-Wevre has published a monograph of the genus

*Landolphia*, from which much of the India rubber exported from Africa is derived, in which he enumerates twenty-one species of the genus, three of which, *L. Lecomtei*, *L. tomentosa*, and *L. Tholloni*, are new and described by himself. The plants of this genus appear to be confined to Africa, occurring between 16° N. and 30° S. latitude. The monograph gives descriptions of all the species, an analytical key for determining them, a very full bibliography, directions concerning the points to be cleared up, and the observations that should be made concerning these plants by future travelers. Points of economic importance are: the kind of India rubber, if any, which the less known species afford, the relative quantities that they yield, their limits of growth as regards temperature, soil, etc.—*Pharm. Journ.*, Aug. 31, 1895, 179; from *Annal. Soc. Scient. de Brux.*, xix, pt. 2.

*African (Lagos) Rubber—Botanical Source, etc.*—The botanical source of the rubber produced in Lagos, a British possession on the west coast of Africa, has been determined at Kew to be

*Kickxia Africana*, Benth. It is locally called *female rubber tree*, to distinguish it from *Holarrhens Africana*, which is called the *male rubber tree*, though it is not known to yield any rubber. The collection of rubber from the *Kickxia* is growing in importance, nearly 600,000 pounds having been exported from Lagos from January 1 to June 30, 1895. To tap the trees, the bark is first cut in a vertical direction from the bottom to the top,  $\frac{1}{2}$  to  $\frac{5}{8}$  inch broad, and deep enough to reach the inner bark. On each side of this main groove, two series of oblique grooves, about 2 feet apart, are cut, beginning at the top and gradually reaching the base of the tree. All the milk exuding from the lateral grooves thus finds its way into the main groove, and so ultimately to the bottom, where a vessel is placed to receive it. Owing to the climbing habit of the species of *Landolphia* which have hitherto yielded African rubber, it was not practicable to cultivate them in regular plantations. With the *Kickxia* this and other practical difficulties disappear, and if the new *Kickxia* rubber continues of commercial value, it will doubtless be possible to establish permanent

plantations.—Amer. Journ. Pharm., April 1896, 212-213; from Kew Bull., Oct. 1895, 241.

*Pulmiera acutifolia*, P.—*Constituents of the Bark*.—The bitter bark of *Pulmiera acutifolia*, which is used in the Dutch East Indies as a remedy for the chronic colic of horses, and contains, according to Altheer and Oudemans, a non-bitter acid—pulmieric acid—contains, according to Boorsma, an extremely bitter neutral substance, which they have named

*Pulmierid*. It is non-poisonous, contains no nitrogen, and is not a glucoside. It crystallizes with 2 mol. of water, its formula being  $C_{30}H_{40}O_{18} \cdot H_2O$ , and is not precipitated by either gold chloride, silver nitrate, lead acetate or subacetate, mercuric chloride, Nessler's reagent, or tannin.—Pharm. Centralh., Oct. 3, 1895, 567; from Mededelingen uit's Lands Plant.

*Taberna Montana Coronaria*—*Remedial Value*.—Prof. Guerrero calls attention to this beautiful ornamental plant, the *snow flower*, which is very plentiful in the Philippine Islands, and adorns the gardens of Manila by the immaculate whiteness of its flowers. The root and root-bark are used medicinally, as is also the latex flowing from the plant when punctured. The Malays hold the root-bark to be an antidote to certain poisons, and apply the decoction of the root to the cure of lumbago and nephritis. The inhabitants of the Malabar coast believe it to be a refrigerant, useful in fevers, administered in a masticatory containing the root-bark—"bonga," or used as a decoction. In India, the latex is applied to wounds to avoid inflammation, and the milk is also used in Manila, either alone or mixed with oil, for cicatrizing wounds. The flowers are, in India, considered of great use in cases of meratitis.—Pharm. Journ., Oct. 12, 1895, 322; from Cronica de Ciencias Médicas.

*Asokanthera Schimperi*—*Source of the "Wa-Nyika" Arrow Poison*.—Thomas B. Frazer and Joseph Tillie record some further observations and researches respecting

*Wa-Nyika Arrow Poison*.—Specimens of the leaves, flowers, and fruit, each taken from the same individual tree, known to be used by the Wa-Nyika, Wa-Gyriama, and other tribes inhabiting the coast region near Mombasa in the preparation of their arrow poisons, have been identified to be *Acokanthera Schimperi*, Benth. and Hook, while the active principle extracted from the wood, has been proven to be identical with the crystalline substance that is contained in the arrow poisons of these tribes. This active principle, a glucoside, is found by the authors to be identical with the crystalline glucoside obtained by Arnaud from the wood of an unidentified species of *Acokanthera*, provisionally named *A. ouabaïo*, and in accordance with this the name

*Ouabain* was given by him to the poisonous glucoside (see Ouabaïo, Proceedings 1889, 447). The authors characterize this principle as

crystallizing from water in the form of colorless, transparent, quadrangular plates, and from alcohol in colorless, thin, needle-shaped crystals, which usually group themselves in tufts and rosettes. At  $13^{\circ}$ – $15^{\circ}$  C. water dissolves 0.93 per cent., and diluted alcohol, of sp. gr. 0.920, 2.4 per cent., but much larger quantities are dissolved by these solvents at higher temperatures. It is insoluble in ethyl-ether and in chloroform; its cold aqueous solution is tasteless and neutral, and it gives with dilute sulphuric acid the reactions of a glucoside. With strong sulphuric acid an immediate red color is produced, which subsequently changes to green. It melts at  $186^{\circ}$  C., and its ultimate composition leads to the formula  $C_{30}H_{46}O_{12}$ , which corresponds to that given by Arnaud, viz.,  $C_{30}H_{46}O_{12}H_2O$ . There being besides this glucoside two other glucosidal active principles described under the name "ouabaïn," both of them amorphous and differing in composition from the one under consideration, the authors propose for the active glucoside from the wood of *Acokanthera Schimperii*, Benth. and Hook., the name of

*Acokantherin*. They also record some physiological investigation, and find that the predominant action of acokantherin is that exerted upon striped muscle, and that, because of this action, with possibly an action upon the intrinsic cardio-motor ganglia, the chief effect is produced upon the heart, while the influence exerted upon the cardio-respiratory centres in the medulla is relatively slight or secondary.—Pharm. Jour., July 27, 1895, 76–77.

#### EBENACEÆ.

*Diospyros Kaki*, L.—*Chemical Examination of the Fruit, and Value as a Nutrient*.—J. Ishii, of the University of Tokio, has subjected the fruit of this plant, the date-plum, to chemical examination with particular reference to its food value, since it is largely consumed by the natives on account of its richness in saccharine matter. There are many varieties of the fruit, ranging in size from a small hen's egg to a large apple. In its unripe state it contains a considerable amount of a kind of tannin, which disappears entirely during the ripening of the fruit. The pulp of the fruit was found to contain a large amount of dextrose and laevulose, but neither mannose nor galactose could be detected in it. It was, therefore, surprising that the seeds contain not a trace of starch, but instead a soft white mass as reserve material, which could be easily converted into a sugar by boiling with sulphuric acid of 5 per cent. for an hour. This sugar proved to be

*Mannose*, while the white substance in the seeds is a polyanhydride of mannose, called

*Mannane*. It is interesting, physiologically, to see that the seed stores up here, in the form of an anhydride, a sugar that is different from the sugars contained in the flesh of the fruit.—Chem. & Drugg., July 27, 1895, 120; from Bull. of the Coll. of Agric. Univ. of Tokio.

## STYRACEÆ.

*Siam Benzoin—Source and Method of Collection.*—A recent report by Mr. Beckett to the British Foreign office (Annual Series, 1895, No. 1520), gives, apparently, the first authentic information respecting the district in which the tree is found that yields Siam benzoin. This is an extremely circumscribed locality on the east bank of the river Mekong, in territory now occupied by the French, and it is feared that the trade in this article will be ultimately diverted to Tonquin, which is nearer to the source of supply than Bangkok. As the result of independent inquiry made at the instance of Kew by the India office, some highly interesting information has been obtained through the Siamese Minister of the Interior at Bangkok, which is more valuable because it gives an account of Siam benzoin from the purely native point of view. According to this report the benzoin tree is large and tall, and is propagated from the original fruit, which, when fallen and lying on the ground takes root and sprouts. The trees are found on elevated ground and do not like the plain country, growing in isolated patches, like the forests of "teng-nang" and teak. A forest patch of benzoin usually contains from fifty to sixty trees and upwards, and the tree is found generally in large numbers along the high hills in the extensive forest region of Slua Than, Tangslok, and the borders of Mliang Theng in the province of Luang Trabang, but is rarely found in other countries, except those immediately contiguous to Siam. The season for working the benzoin tree is from July or August to September or November, and is worked after the following methods: The trees are notched, so as to form a girdle around the stem. A period of three months is allowed to lapse between the period of notching and that of picking the benzoin, which wells out of the trunk and collects in the notches. By means of a sharpened stick or the point of a knife this is picked out, bark and all, and gathered at once in baskets. It is then sorted and divided into different classes Class I, II and III being mentioned. The interval of three months between the period of notching and picking is necessary to harden the exudation. If picked before this time it is still soft and sticky; it would become dirty, owing to the bark coming off with it, and, clinging to other things in its sticky condition, the collection would be wasteful. The collection of benzoin is generally regarded by the people pursuing it as sufficient means of gaining a living, and the industry appears to be open to all, any one being at liberty to go into the jungle districts where the trees grow and notch as many as he pleases.—Amer. Journ. Pharm., Oct. 1895, 523-528; from Kew. Bulletin Journ., July and Aug., 1895.

## COMPOSITÆ.

*Dandelion—Coloring Matter in Root Collected in the Fall.*—Albert Burnham Clarke has obtained in dandelion root collected in the fall of the

year (October) a peculiar coloring matter, soluble in alkalies with a deep red color, which is apparently not present in roots collected in the spring of the year. The coloring matter can be obtained comparatively pure by washing the chloroformic extract of the drug with water made alkaline with potassium hydrate, filtering the deep red watery solution and neutralizing it with sulphuric acid, when it is precipitated in form of a yellowish-brown magma. It is readily soluble in alcohol, benzine, benzol, chloroform, ether, etc. When precipitated from an alkaline watery solution a small amount of the substance remains in solution, coloring the liquid yellow. An alkaline solution treated with zinc dust and heated is reduced, the color disappearing, but when allowed to stand in contact with air it is quickly oxidized, and the red color reappears. While this coloring matter has never been observed in roots collected in the spring, it is not always present in the fall roots, as several specimens collected in October and November were examined and found to be free from the coloring matter sought.—Proc. Kansas Pharm. Assoc., 1895, 68-69.

*Chicory—Use in the United States.*—From the Consular Report of Henry C. Morris it appears that the chicory crop in Belgium amounts to about 350,000 tons, of which 4,000 tons are sent to the United States. It is stated that the consumption of chicory as a substitute or adulterant for coffee is annually increasing in the United States.—Am. Jour. Pharm., July, 1895, 375.

*Anthemis Nobilis—A Monstrosity.*—Clement B. Lowe describes a peculiarity in plant growth that has come under his observation. The plant, which is probably *Anthemis nobilis*, was grown by a gardner in Bucks County, Pa. The peculiarity consisted in that the stems, instead of being slender and about  $\frac{1}{16}$  to  $\frac{1}{8}$  of an inch in diameter, are flattened and an inch or more in width. This peculiar development is attributed by the author to the union during growth of a large number of ordinary stems.—Amer. Jour. Pharm., April, 1896, 191.

*Pyrethrum cinerariaefolium—Nature and Extraction of the Active Principle.*—According to De Boisse, the active principle of Dalmatian Insect Flowers is a yellow resin, very soluble in ether, by which it is readily extracted. It has the color and consistence of virgin wax, and an apple-like odor. It is insoluble in water, and only slightly soluble in alcohol, carbon disulphide, or fatty bodies. According to its intended use—whether for medicinal or agricultural purposes—it may be extracted from the finely chopped fresh flowering tops by maceration with half their weight of ether, vaselin oil, colza, or petroleum, for seven or eight hours, and then strongly expressed. The solutions in colza and petroleum have a wide application in agriculture to destroy insect parasites, being applied directly to trees or shrubs; or, emulsified with forty times their weight of soot water, they may be used for spraying twigs and leaves.—Pharm. Journ., Nov. 2, 1895, 367; from Rev. de Scient. Natur., xlii, 589.

*Achillea millefolium*—*Medicinal Value*.—Dr. Mennella, at the recent Italian Congress of Physicians in Rome, has rescued millfoil from the disuse into which it has fallen, the plant being at the present time rarely prescribed, and used only as a vulnerary and in veterinary practice. He states that the plant, which has a bitter and strong aromatic taste, contains a tannin which makes it valuable as a remedy in chronic catarrh of the stomach. It is probable also that the plant may prove valuable as a cardiac remedy, but this remains to be determined by pharmacological experiments. It, moreover, possesses decided value as a preventive of the formation of stones in the bladder, as well as for their expulsion, this action being due to the diuretic properties of the aromatic constituents of the plant.—Pharm. Centralh, Dec. 12, 1895, 717; from D. Med. Zeitg., 1895.

*Senecio*—*Alkaloidal Constituents of Several Species*.—The alkaloids *senecionine* and *senecine*, which have been known as constituents in minute quantities in the groundsel, have been found by Lutz in several other species of *Senecio*; in the largest quantities in *Senecio cruciæfolius* and *S. palustris*, and in smaller ones in *S. jacobæa* and *S. cineraria*. The alkaloids occur in all cases in the underground parts, to the entire exclusion of the aerial organs, and are chiefly found in the pith, the liber, and the cortical parenchyma.—Pharm. Jour., Dec. 28, 1895, 535; from Bull. Soc. Botanique de France, 1895, 486.

*Aplopappus Fremonti*—*Proximate Examination*.—Thomas M. Bailey calls attention to *Aplopappus Fremonti* as furnishing a drug which in Colorado has a local and widening reputation as a nervine and aphrodisiac. The portion of the plant that constitutes the drug is not stated, but it is apparently the entire plant. It yields to boiling water 2.012 per cent. of extract, to cold water 1.944 per cent., to diluted alcohol 1.915 per cent., and to alcohol 0.325 per cent. It contains about 1.04 per cent. of volatile oil which has the characteristic odor of the plant, 1.76 per cent. of an acrid fixed oil, 2 per cent. of resin, and other unimportant constituents. Evidence of alkaloid was not obtained.—Proc. Kansas Pharm. Assoc., 1895, 70-72.

## RUBIACEÆ.

*Cinchona "Ledgeriana"*—*Biographical Sketch of Mr. Charles Ledger*.—The "Chemist and Druggist" (July 27, 1895, 118-120) publishes a biographical sketch of Mr. Charles Ledger, through whose intervention the plant producing the richest quinine bark, *Cinchona Ledgeriana*, was introduced into the East Indies. The sketch is particularly interesting to the pharmacological historian, and is mainly autobiographical, Mr. Ledger giving an account of his career from his far-away home in Australia. A sad feature connected with it, is the fact that Mr. Ledger is now, at the age of seventy-seven years, living in abject poverty, and that contributions solicited by the above named journal have come in so parsimoniously as to offer practically no relief.



*Cinchona* — *Comparison of the More Recent Methods of Assay.*— Lyman F. Kebler communicates the results of some studies made with the more recent methods for the assay of cinchona. He divides those that are considered most efficient and practicable for extracting the alkaloids both from the bark and its galenical preparations into two classes :

(1) The powdered bark or its preparations are macerated with ether and ammonia water, or a mixture of chloroform, ether and ammonia water, and an aliquot part taken for analysis.

(2) The powdered bark or its preparations are macerated with a mixture of chloroform or ether, or a mixture of both in conjunction with alcohol and ammonia water, and an aliquot part taken for analysis.

The first are the methods recommended by Schweissinger, Sarnow, Keller, and the author ; the second, by Prollius, De Vrij, Lyons, Haubensak, Kürsteiner, and the U. S. P., 1890, and the author exhibits in a tabular view the agents employed in these different methods for the extraction of the alkaloids, etc. He observes that the introduction of Prollius' method marks a new era in drug assaying, since it contains the germ from which have sprung nearly all of the most valuable methods of recent date. Prollius proposed to employ an ethereal solvent for estimating the ether-soluble alkaloids, and a chloroformic solvent for extracting the total alkaloids. Originally designed for determining the alkaloidal value of cinchona bark, by various modifications, the method has become available for the assay of a large number of narcotic drugs and their preparations. The period of maceration, also, instead of being prolonged for twenty-four hours, has been found sufficient if extended over four hours.

The methods referred to by the author have all been published, and are carefully referred by him to their original, as well as convenient, publication, so that reference may be had to them by those interested. Respecting the U. S. P. process, he observes that it yields only 140 Cc. of fluid for further examination, unless pressure is resorted to, whilst 150 Cc. is expected. The method of Prollius yields impure alkaloids and possesses undesirable features. The methods that have proven quite satisfactory are those in which the immiscible extractive solvents are directly shaken out with acidulated water, and after eliminating Kürsteiner's modification of Haubensak's method, as not possessing any advantage over the original process, and that of Keller, he concludes that the following three processes leave very little to be desired, viz. ; Lyon's general process, No. 2, with Prollius' mixture ; Haubensak's process and the author's own "chloroform-ether" process, which he prefers to the other two processes, for no other reason, possibly, than that, while giving equally accurate results, the color of the alkaloids is nearly white. The author gives, in tabular form, the results of the examination by the various processes mentioned of cinchona bark, and of fluid extracts prepared from them, which may be profitably consulted in the original paper, in Amer. Jour. Pharm., Feb., 1896, 79-84.

*Ipecacuanha—Research Notes.*—In continuation of his experiments communicated at last year's meeting of the British Pharmaceutical Conference (see Yearbook of Pharmacy 1894), R. A. Cripps communicates the results of some further investigations respecting the more important constituents of ipecacuanha. These results are, as the author himself mentions, of an unfinished character, and lead to nothing that need be recorded here. Incidentally he has carried out a few experiments bearing upon points of interest connected with the chemistry and pharmacy of ipecacuanha. His observations on acetic extract of ipecacuanha (which see under "Pharmacy") support the view that a weaker acid is desirable for its preparation. Respecting the presence of a volatile alkaloid, resembling choline, recently described by Arndt, he states that he has repeated Arndt's process, but has been unable to detect any trace of volatile alkaloid. He also gives some comparative results with Keller's, Lyons' and his own (acetic ether) methods of assay, which speak in favor of the greater accuracy of the two last named.—Phar. Jour., Aug. 24, 1895, 159-161; from Proc. Br. Phar. Conf., 1895.

*Brazilian and Columbian Ipecacuanha—Estimation and Comparison of Alkaloidal Constituents.*—B. H. Paul and A. J. Cownley observe that the question of relative medicinal value of the two kinds of ipecacuanha now met with in commerce has acquired greater importance since the pharmacological observations conducted by Dr. Wild have shown that there is a well-marked difference between the effects produced by the two bases, emetine and cephaeline, which are present in these drugs in different relative proportions. The authors have now conducted some experiments, and have made analyses of both kinds in order to obtain some information that would allow of an opinion being formed as to the desirability of extending the definition of the ipecacuanha, so as to include the Columbian drug. They have found amylic alcohol, upon the whole, preferable to alcohol for the purpose of extracting the alkaloids from the mixture of ipecacuanha and lime, for there is less liability of decomposition of the alkaloids than when alcohol is employed, which is conceded to be a more efficient solvent. After giving the method of analysis in some detail, the results obtained with selected samples of Brazilian and Columbian ipecacuanha are given as follows:

	Brazilian.		Columbian.
	Root.	Stems.	
Emetine .....	1.45	1.18	0.89
Cephaeline .....	0.52	0.59	1.25
Third base .....	0.04	0.03	0.06

These results show that although the total amount of alkaloid in the two kinds of *ipecuaanha* does not differ very materially, the relative proportions of emetine and cephaeline are so different that these two drugs cannot be regarded as interchangeably indifferent, since Dr. Wild has shown emetine to possess superior expectorant properties, while cephaeline is undoubtedly superior as an emetic. The difference in the relative proportions of the two alkaloids in the two drugs is rendered more apparent in the following table, showing the percentage of each base in the total alkaloid :

	Brazilian.		Columbian.
	Root.	Stems.	
Emetine.....	72.14	65.6	40.5
Cephaeline.....	25.87	32.8	56.8
Third base.....	1.99	1.6	2.7

The "third base" noted in the tables was obtained from the alkaline liquor from which emetine and cephaeline had been extracted by ether, by shaking it several times with chloroform, in which it is freely soluble. It is crystalline, and very sparingly soluble in ether. The analytical results obtained by the authors, it will be noted, correspond very closely, as regards the amount of total alkaloid, with those obtained by Lyman F. Kebler (which see below).—*Pharm. Journ.*, April 25, 1896, 321.

*Ipecac Root—Percentage of Alkaloid in Commercial Samples*—Lyman F. Kebler has determined the alkaloid in 16 samples of ipecac root by titration with volumetric acid solution, with results as follows: 2.10, 2.64, 2.35, 2.36, 2.25, 2.65, 2.43, 2.45, 2.54, 2.65, 2.10, 2.13, 2.45, 2.11, 2.41 and 2.43 per cent. These results would prove the drug to have been of a very satisfactory quality during the past year.—*Amer. Jour. Pharm.*, April, 1896, 196.

*Ipecacuanha—Estimation of Emetine*.—A. Mendini describes the following process for estimating emetine in *ipeacuanha*, which has given satisfactory results: Ten Gm. of the powdered drug is treated with ammoniated chloroform in a Soxhlet apparatus until no further reaction is obtained with Mayer's reagent—this operation requiring about 30 hours. The chloroform is distilled off, and the moist residue is treated with 10 Cc. of water acidulated with hydrochloric acid, the solution filtered with the help of an aspirator, and the residue on the filter washed with a few drops of water. The filtrate is precipitated with ammonia, the precipitate dried at 100° C. on a tared filter, washed with 4 to 5 Cc. of water, again dried at 100° C., and weighed. The author found 2.11 per cent. of eme-

tine in the same sample in which, by the process of the Italian Pharmacopœia, Kokmayer had obtained 2.27 per cent.—Amer. Drugg., April 10, 1896, 216; from Bollet. chimico-pharm.

*Ipecacuanha*—*Microscopical Examination of Commercial Powders*.—Henry G. Greenish records the results of the microscopical examination of thirty-two samples of powdered ipecacuanha obtained from pharmacists in London and the provinces. The examinations were made on the lines of a comparative histological examination of a number of samples of ipecacuanha, the results of which were communicated by him to the British Pharmaceutical Society last February, and which were summarized by him as follows: Ipecacuanha root, whether Brazilian or Carthagena, may be distinguished as such in the form of powder by (a) the shape and size of the starch grains, (b) the absence of vessels, presence of tracheids, (c) the acicular raphides, and (d) the emetine reaction with chlorine. The stem may be distinguished from the root (in powder) by (a) the presence of sclerenchymatous cells, (b) of lignified cells of pith, and (c) of spiral vessels. Carthagena ipecacuanha may in most cases be distinguished from Brazilian by the larger size of its starch grains; not losing sight, however, of the fact that Carthagena roots with small starch grains also occur, which are practically indistinguishable from the starch of Brazilian roots with large grains.

The author considers that the value of a chemical examination—the determination of alkaloids, etc.—can be positive only if it is preceded by the microscopical examination. But before such a microscopical examination can be undertaken with any prospect of obtaining reliable results, the microscopist must make himself familiar with the structure of the typical drug, as well as the principal variations from the type that may occur in commerce. He will then be in position to detect that which is not genuine, the determination of what the impurity is being of secondary importance.

The author gives the results of his present examination in the form of a table, in which he shows that twenty of the samples examined were the powders of Brazilian roots and twelve of Carthagena, though some of the samples designated as Brazilian may have been mixtures of the two. Of all of these samples only one can be regarded as the powder of really good Brazilian root free from stem, and conforming absolutely to the requirements of the B. P. Without insisting upon the complete absence of the stem, the author is of the opinion that much of the powdered ipecacuanha sold by pharmacists contains an undue proportion of stem and wood. The presence of stem is avoidable, since it can be easily separated from the drug by picking; the presence of wood indicates the use of inferior drug. Carthagena roots, not being official, must be regarded as substitutions. The results are summarized by the author as follows:

Good Brazilian Ipecacuanha .....	22 per cent.
Medium " " .....	31 per cent.
Bad " " .....	10 per cent.
Carthagena " .....	37 per cent.

—Pharm. Jour., Aug. 17, 1895, 137-138; from Proc. Brit. Pharm. Conf., 1895.

*Ipecacuanha—Occurrence of Damaged Roots in the London Market.*—It is stated in Cæsar & Lorentz's Report (Sept., 1895), that a sort of Rio Ipecacuanha has found its way into the German markets from London, which differs from the unmanipulated drug in its external characters, and has evidently been subjected to a process of washing. It is dark brownish in color externally, the color internally being also darker than is usual, and is further characterized by a smoky odor, evidently the result of the drying process after washing. The genuine—or rather natural—drug having a dirty greyish color, the washed drug is frequently preferred on account of its clean and handsome appearance and uniformity, it being carefully garbled before marketing. Experience has shown that such manipulated ipecacuanha, which has usually been injured during the sea-voyage, contains inferior percentages of alkaloid.—Pharm. Centralh., Sept. 12, 1896, 526.

*Ipecacuanha—Pharmacological Action of its Alkaloidal Constituents, Cephaeline and Emetine,* which see under "Organic Chemistry."

*Ipecacuanha—Use as a Topical Application in Bee Stings.*—The "Indian Medical Gazette" calls attention to the case of a Calcutta physician who, having been attacked by a swarm of bees, was severely stung on the hand, head, face and neck, no fewer than 150 stings being afterwards taken from the neck. Having some ipecacuanha powder with him, he immediately made it into a paste and smeared the paste over the affected parts. The effect of the ipecacuanha was most marked, the pain and swelling which invariably follow the bee's sting being to a large extent prevented.—Amer. Drugg., April 10, 1896, 215.

*Coffee—Micro-chemical Localization of Caffeine and Caffetannic Acid in the Plant.*—Gaucher's experiments have determined that caffetannic acid is revealed under the microscope in all parts of the plant, while caffeine is *not* found either in the pericarp of the fruit, the root, or the stems of plants cultivated in a hot house. In the leaves it is found in the mesophyll, and in the seeds it is found in the embryo and the albumin. Young plants, which contain no chlorophyll, are devoid of caffeine. The most suitable reagent for the micro-chemical determination of *caffeine* was ammonium chlorhydromolybdate—a saturated solution of ammonium molybdate and ammonium chloride—which produces an amorphous white precipitate which becomes blue—by reduction of the molybdic acid—on drying. Ammonium vanadates, also, serve a good purpose, producing in

the hydrochloric solution a faint precipitate which remains as a handsome red residue on evaporation. For the determination of *caffetannic acid* ferric chloride and ammonium chlorhydromolybdate are recommended; the first giving a green color, while the second reagent produces a yellow-brown coloration.—Pharm. Centralh., Oct. 10, 1895, 580; from Rep. de Pharm., 1895, 341.

*Coffee—Preservation of Aroma after Roasting.*—A. Stutzer calls attention to the increasing practice in Germany of adding sugar in excessive quantities to the coffee during the process of roasting. Originally this addition was made with the view to preserving the aroma of the roasted product, the coating of caramel produced upon the coffee closing the pores and preventing the exudation of oil as well as access of air to the interior. But at the present time the quantity of sugar so added is largely in excess of necessity, and in many instances produces a caramel coating so thick as to prevent the recognition of inferior seeds and to amount to actual adulteration by increasing the weight of the coffee. An association of German wholesale coffee dealers has therefore resolved that in future the practice of weighting coffee with foreign additions must be avoided. It is permissible, however, to add such to the extent of not exceeding 1 per cent. of the green coffee, with the view to preserving the aroma of the roasted article; but the external characters of the seeds must not be changed by such additions, so that the purchasers may be able to recognize inferior or unripe seeds. The association has determined to use for this purpose an extract prepared from the fresh pulp of the coffee-fruit, which is now produced in localities where the coffee is grown, and Stutzer finds experimentally that this extract is admirably suited for this purpose, since it contains, besides traces of caffeine, considerable quantities of *caffetannic acid*, which, during the roasting process, produces aromatic products similar to those produced in coffee. The by-taste produced by other additions heretofore used—sugar, starch-syrup, etc.—is thus avoided, and the aroma of coffee is well preserved.—Pharm. Centralh., Aug. 29, 1895, 494; from Zeitschr. f. angew. Chem., 1895, 447.

#### CAPRIFOLIACEÆ.

*Sambucus Canadensis—Proximate Constituents of the Bark.*—C. Otto Moosbrugger has made a chemical investigation of elder bark, and found it to contain the following constituents: Fat and wax, 1.34 per cent.; crystallizable resin and chlorophyll, 1.78 per cent.; substances extracted by absolute alcohol, 2.38 per cent.; mucilage, 2.16 per cent.; glucose, 2.12 per cent.; saccharose, dextrin and other substances soluble in water, 2.86 per cent.; pectin and albuminous compounds, 6.92 per cent.; par-arabin compounds, 2.36 per cent.; lignin, 7.86 per cent.; moisture, 6.83 per cent.; ash, 5.75 per cent.; undetermined organic matter, 57.64 per cent. Neither tannin, starch, alkaloids, or glucosides were present. The

bark is said to be used as a poultice for "foot-rot" in cattle.—Am. Jour. Phar., Oct., 1895, 520.

*Viburnum Prunifolium* and *V. Opulus*—*Characters of Distinction*.—L. E. Sayre records the results of some microscopic and pharmaceutical experiments made with authentic specimens of the barks of *Viburnum prunifolium* and *V. opulus* with a view of establishing distinguishing characteristics which will identify the bark of the stem and the bark of the root of *V. prunifolium*, and will distinguish between the barks of the two species. As a result of the microscopic examination the author finds that the bark of the young stems or branches differs from that of the older ones, in the fact that the stone cells, revealed in both, are in smaller groups. This is because in the old bark the earlier formed masses of stone cells have been cut off by the secondary cork formations, and the later formed groups of stone cells in the inner layers of the bark are of larger size than the older ones farther exterior. The bark of the root of *V. prunifolium* differs from that of the stem chiefly in the fact that its groups of stone cells are farther apart and average somewhat larger in size. The outer bark is also thicker and more spongy in its texture. As to the microscopic characters of distinction between the barks of the two species, further experiments and examinations will have to be made. Both barks have a peculiar and pronounced odor, that of *V. prunifolium* being somewhat disagreeable. In this bark also the bitter taste—due to a bitter principle present in all the barks—is decided, and particularly in the root bark, and the bark of the small branches; in the bark of *V. opulus* there is not much bitterness, but there is quite an astringent taste.

The pharmaceutical examination consisted in exhausting the barks successively with chloroform, with alcohol and with water. The results, compiled from the text and the table appended by the author, appear to be as follows:

	<i>V. prunifolium</i>	<i>V. opulus</i>
Chloroformic Extract.		
Soluble in water .....	.0918 per cent.	.100 per cent.
Soluble in petroleum spirit.....	1.66 "	7.83 "
Resinous matter.....	2.44 "	.75 "
Residue.....	1.7882 "	.78 "
Total... ..	5.98 per cent.	Total 9.46 per cent.
Alcoholic Extract.....	30.3 per cent.	19.38 per cent.

The distinguishing point in the alcoholic extracts was the very astringent taste in that from *V. opulus*, which was almost entirely lacking in that from *V. prunifolium*. The author's paper is embellished by several illustrations, showing the microscopic sections of both barks, but these can be profitably consulted only in connection with the full text, in Amer. Jour. Pharm., Aug. 1895, 387 394.

*Viburnum Opulus* and *V. Prunifolium*—Proximate Examination.—

Edward E. Cossman read a paper before the Kansas Pharmaceutical Association at the meeting in 1895, in which he gives the details of his examination of the bark of *Viburnum opulus* and *V. prunifolium*, which are referred to in the above paper of Prof. Sayre.—See. Proc. Kansas Phar. Assoc., 1895, 76-79.

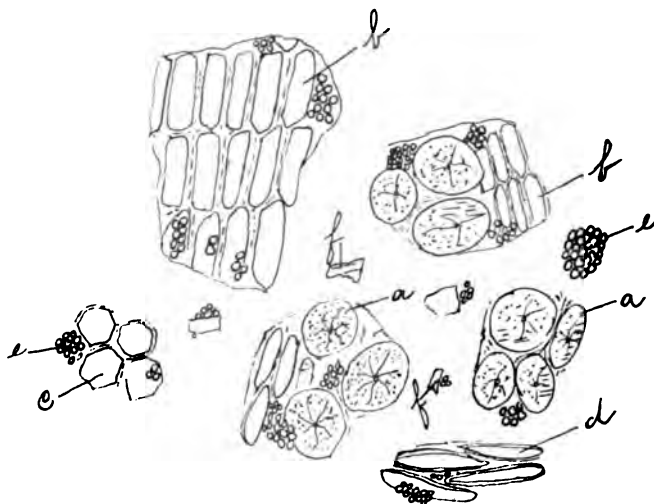
*Viburnum Barks*—Microscopic Distinction of the Powders.—In a second paper Mr. Sayre describes a method for the microscopic examination and distinction of virburnum barks in the powdered condition. Speaking of the examination of powders in general, he says that before being able to identify drugs in the powdered condition it is necessary to fix upon some feature of them that is most prominent and characteristic. In the case of leaves, for instance, there are often hairs and glands that, in their form, seem at once to distinguish the specimen upon which they occur. Even in the class of powders known as impalpable, while they present greater difficulty, some elements or fragments are always found whose characteristics are constant and sharp, and which the pulverization has not greatly modified. The examination may be necessarily modified to suit different powders, but in general is as follows: Add a few particles of the well-mixed powder to a mixture of alcohol, glycerin and water contained in a capsule; after about two hours' maceration, examination is commenced, when the nature of the elements inclosed in the cells, which have not been destroyed by pulverization, can be determined. To render more apparent the forms of the various separated elements and fragments, boil the powder in an alkaline water. In this manner one can distinguish more quickly and more completely all those histological peculiarities, which were rendered partly invisible by the presence of the contents. It is essential, when examining this fluid mixture of the powder (contained, for instance, in a homœopathic vial), to take samples from the bottom, middle and top of the fluid, in order to obtain all the elements. In the illustrations accompanying his description of the powders the author shows the results obtained under the most favorable conditions. They are evidently forms selected from a number of microscopic fields, and are such forms as may be seen if thickness of fragment, coloring matter and other causes do not prevent.

*The powdered bark of the root of V. prunifolium* is grayish in color, and shows sharp distinctions under the microscope (see Fig. 62) from the bark of the trunk and that of the twigs. It displays a great number of starch granules, which are evidenced more pronouncedly by treatment with iodine, T. S., and the difference from the others is brought out very visibly. The taste, also, is much more bitter.

*The powdered bark of the trunk of V. prunifolium* is brownish or reddish-gray in color, darker, by several shades, than that of the other varieties; its taste but slightly bitter. Under the microscope (see Fig. 63) the ab-

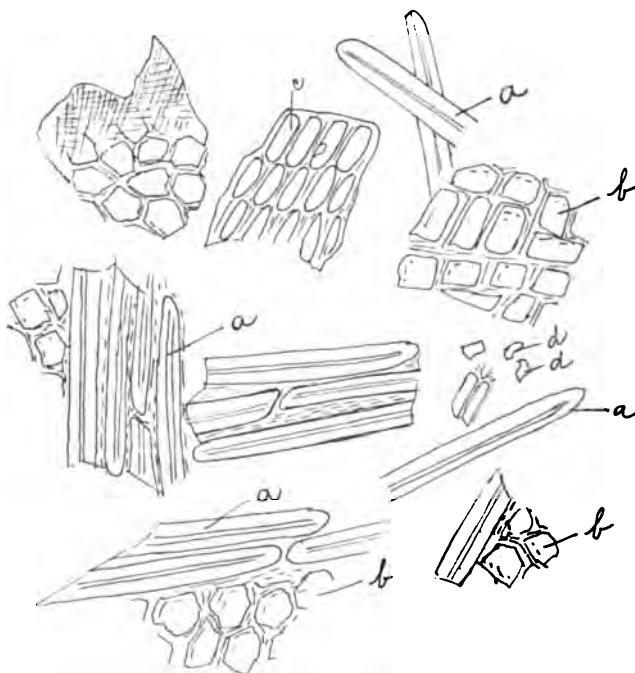


FIG. 62.



*Viburnum prunifolium*. Powdered root-bark, x 400: *a*, stone cells; *b*, inner bark cells; *c*, middle bark cells; *d*, inner cells of middle bark; *e*, starch grains; *f*, fragments of cork layer.

FIG. 63.



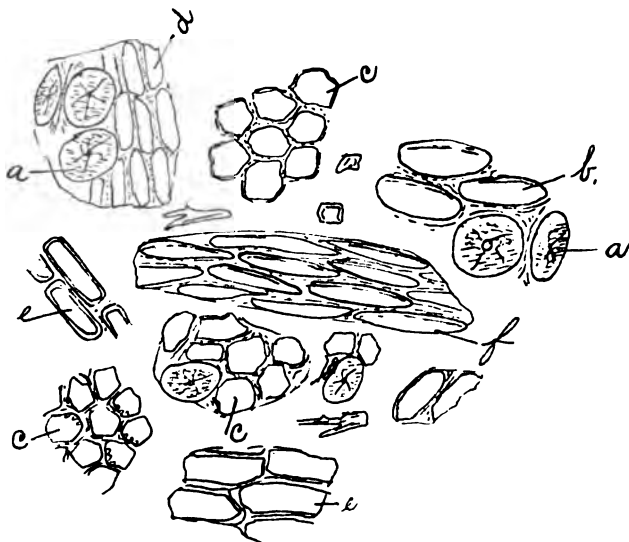
*Viburnum prunifolium*. Powdered trunk bark, x 400: *a*, stone cells; *b*, inner bark cells; *c*, middle bark cells; *d*, outer cells of middle bark; *e*, inner cells of inner bark; *f*, cells from outer layer.

sence of fibrous tissue is noticeable. The stone-cells are readily distinguished and quite numerous, as they are in the bark of the twigs and of the root.

The powdered bark of the twigs of *V. prunifolium*, when viewed under the microscope, reveal a close resemblance to the trunk bark. Its color, however, is light brownish-gray, and quite characteristic.

The powdered bark of *V. opulus* is of a silver-gray color. Under the microscope (see Fig. 64), it presents a fibrous appearance, the woody

FIG. 64.



*Viburnum opulus*. Powdered bark, x 400: *a*, bast fibres in bark, situated in middle bark; *b*, middle bark cells; *c*, outer layer of middle bark; *d*, fragments of cork layer.

fibres being numerous. In this bark a solution of ferric chloride showed a decided reaction in bringing about a darkening of the tissues of the middle layer.—*Amer. Jour. Pharm.*, May, 1896, 225-232.

#### UMBELLIFERÆ.

*Umbelliferæ*.—*Presence of Calcium Oxalate in the Pericarp of Many Species*.—R. von Wettstein calls attention to the presence of crystals of calcium oxalate in the pericarp of *Umbelliferæ*, and its value for the purpose of classification. Observations were made on 220 species, belonging to nearly 100 genera. He finds that the presence of these crystals, and still more their mode of distribution, is very often characteristic of natural groups. The various modes of deposit may be classed under three heads, viz., those of *Hydrocotyle*, of *Sanicula*, and of *Scandix*. The *Hydrocotyle* type of pericarp is characterized by an endocarp composed of an inner

hard layer and an outer coat containing crystals, and is universal in the tribes *Hydrocotylæ* and *Mulineæ*. The genus *Erigenia* must be excluded, while *Hermas*, *Actinotus*, and *Astrotricha* must be included.

In the *Sanicula* type the clusters of crystals are usually grouped at particular spots of the pericarp, and deposited in parenchymatous cells; it is characteristic of the tribe *Saniculæ*, from which *Arctopus* and *Lagœcia* must be excluded, while *Lichtensteinia* and other allied South African genera must be included.

The *Scandix* type is characterized by the occurrence of usually single crystals in several layers of cells along the commissure and around the carpopore, and is universal in the *Scandicineæ* and *Caucalineæ*.—Pharm. Jour., Dec. 21, 1895, 514; from Proc. Acad. Sciences, Vienna.

*Asafetida—Commercial Quality and Pharmacopœial Requirements.*—J. U. Lloyd, after giving a brief description of the drug and a review of the recent literature on the examination of asafetida, communicates in some detail examinations and experiments made by him with the view to establishing the character of the drug found in the market, to determine the impurities that occur accidentally or otherwise, and to secure an article that shall be suitable for medicinal (or pharmacopœial) requirements. Concerning the first, he finds it difficult to procure asafetida that will conform to the requirements of the U. S. P., only one of six samples selected from so many different parcels conforming to that standard. This sample contained about 66 per cent. of substances soluble in alcohol, as confirmed in an extra sample from the same parcel, and yielded about 16 per cent. of ash, composed mainly of calcium carbonate and sulphate. The other five samples contained (in round figures—Rep.) respectively 36, 38, 41, 44 and 55 per cent. of alcohol-soluble matter, and yielded 21, 35, 38, 43 and 49 per cent. of ash, mainly composed of gypsum in two cases, of gypsum and carbonates in two others, and gypsum and occasional lumps of stone in the fifth. Three of the samples are characterized as dry, and two of them as soft, one of the latter being the one containing the largest amount of ash and the smallest of alcohol-soluble substance. This also contained as visible impurities cloth, bristles and wood. So far as accidental impurities, or, for that matter, added impurities are concerned, the author is convinced that this is beyond the power of supervision by the importers, and the demand that crude asafetida conform to the official requirements will probably render it impracticable for them to offer the drug in any considerable quantity. Added mineral matters are easily determined; but not so additions of alcohol-soluble resins, such as rosin or white turpentine which have in recent years been recorded. For the detection of the latter the determination of the acid number may prove of some service, and the author records some experiments in this direction made upon these alcoholic extracts of the several samples, which seem to bear out this view. He found the acid number for "purified asafetida" (to

be mentioned presently) to be 31.1, a figure which is probably too low ; other samples give numbers from 38 to 69 ; whilst for white turpentine the acid number was found to be 153.3, and for rosin, 164.5. None of the samples examined, therefore, contained either of these added resins. Being convinced that the quality of crude asafetida is beyond the control of the drug inspectors, the author suggests that the U. S. P. introduce a

*Purified Asafetida*.—Such a preparation is readily made by abstracting crude asafetida with alcohol and evaporating the alcohol. Very little of the volatile oil is lost in this process—as the author has convinced himself—and while the product cannot be rolled out into a pill without addition, it makes a superior emulsion when triturated with water.—Pharm. Review, March, 1896, 54–58.

*Ammoniac—Examination of Constituents*.—H. Luz has subjected ammoniac to examination with the following results : The gum resin is composed of resin, gum and volatile oil, together with 3.5 per cent. of residue insoluble in water and in alcohol. The resin dissolved by alcohol and ether is a mixture of an *acid* and an *indifferent* resin, both of them free from sulphur, in contradiction to the observation of Prciszewski, and they amount to 69 per cent. By saponification the acid resin yields salicylic acid, together with valerianic and butyric acids, and an alcohol, belonging to the series of resino-tannoles, and having the formula of galba-resino-tannol,  $C_8H_{10}O$ . The ammoniac resin is therefore a “galba-resino-tannol-salicylic acid ester. By oxidation with nitric acid the alcohol ammo-resino-tannol yields strychnic acid ; by melting with alkali it yields resorcin. The volatile oil is present only in small quantities in the gum-resin. It contains neither umbelliferon nor sulphur. Traces of free salicylic acid were determined in the crude ammoniac. The gum is an acid calcium arabinates, closely related to gum arabic.—Schwz. Wochenschr. f. Chem. u. Phar., 1895, 441.

*Osha or Colorado Cough Root—Description and Proximate Examination*.—Prof. L. E. Sayre has had opportunity to examine an authentic specimen of the plant which furnishes osha or Colorado cough root, a drug which has considerable reputation in the far west as a cough remedy, and which is regarded by some as a veritable cure-all. The plant is found growing at an altitude of from eight to ten thousand feet, usually bordering upon damp ground, throughout the northern part of New Mexico and Colorado to Wyoming and westward to Utah, Wahsatch and Uintah mountains to Yellowstone Park. From the specimens and information received from Prof. John Kochan, of Denver, Colorado, the author is inclined to think that the plant agrees more nearly with

*Ligusticum Scopulorum*, Gray, than with any other species that has been mentioned as yielding the drug. The stem is  $1\frac{1}{2}$  to 4 feet high, with a glabrous, white inflorescence, leaves pinnately decompose, segments

deeply incised; cauline leaves ternate on short dilated sheaths; flowers consisting of four compound umbels on long peduncles, each having about twenty umbellules; fruit about four lines long, consisting of a conical and prominent stylopodia, and somewhat winged ribs; seed with a long depression down the middle of the inner face and with three well-marked ridges on the outer face. A cross-section of the mericarp shows on each carpel twenty-two oil tubes. The dried root is long, fusiform, about one-half inch in diameter at the largest part, and is usually surmounted by the rough annulated root-stalk, which is beset with short, closely appressed hairs, and in the older roots is more or less branched. The root-portion is more or less wrinkled, usually with rootlets detached, but, when present, closely pressed to the main root. Externally it is brown or brownish-black, the wood yellowish-brown, consisting of a loose coarsely-fibrous layer, surrounding a lighter-colored pitch-like central wood-cylinder. The most characteristic feature of the root however is its peculiar aromatic odor, which is so pungent as to scent a large room rapidly. Its taste is warm and spicy, exerting a stimulating influence upon the mucous membrane of the throat and nose.

A proximate examination of the drug was made in two samples obtained from different parts of Colorado, the result being given as obtained by W. F. Bowen. The two samples differed slightly in their color and structure, but otherwise they resembled each other very closely. In their proximate constitution, also, they agreed very well, the only appreciable difference being in the color and sp. gr. of the volatile oil. It will therefore suffice to give in brief the result obtained in the sample designated as variety *A*: Moisture 1.13 per cent.; ash, 5.75 per cent.; chloroformic extract (volatile oil, 6.78 per cent.; fixed oil, 6.64 per cent.; resin, 11.58 per cent.); 25.00 per cent.; alcoholic extract (organic acids, 2.716 per cent.; sugar, 1.84 per cent.; extractive, 9.401 per cent.), 13.96 per cent.; aqueous extract (gum, 2.24 per cent.), 10.32 per cent.; acidulated aqueous extract (precipitate upon neutralization 1.30 per cent.; sugar, by starch, 5.2 per cent., or starch, 4.68 per cent.), 16.10 per cent.; alkaline aqueous extract (precipitate upon neutralization, 3.90 per cent.), 20.28 per cent.; cellulose, lignin, etc., 14.036 per cent.; sand, etc., 0.946 per cent. The volatile oil obtained by distillation from variety *A* was almost colorless, but rapidly changed to straw color, had a sp. gr. of 0.924, the odor of the root, and produced a hot pungency on the tongue. It had an acid reaction, and produced a sodium salt which crystallized in fine needles. The terpenes separated from it boiled at 160 to 200° C. The volatile oil from the variety *B*, had essentially the same characters; but the color when first distilled was pale-green, changing to yellowish-green, and the sp. gr. was 0.958. The paper is accompanied by cuts showing the plant, the flower, the fruit, cross section of the latter and transverse and cross section of the root, a concise microscopic description of the latter being given. Prof. Sayre has found

a 10 per cent. syrup of the root to be an efficient cough remedy and useful in hoarseness, sore throat and diseases arising from colds in general.—Drugg. Circ., March 1896, 54-55.

*Osha Root—Proximate Examinations.*—Mr. Wm. F. Bowen communicated the results of the examination of two specimens of osha root in a paper read before the Kansas Pharmaceutical Association, 1895, his results being essentially those quoted in the above paper by Prof. Sayre. See also Proc. Kansas Pharm., 1895, 72-76.

#### RANUNCULACEÆ.

*Japanese Aconite—Substitution by Indian Aconite.*—Clement B. Lowe calls attention to a recent substitution of Indian aconite (*Aconitum ferox*, Wallich), for Japanese aconite (*Aconitum Fisheri*, Reich), purchased for cabinet specimens. There is no necessity for confounding these drugs one with the other, as they differ in a marked degree; Indian aconite being one of the largest of the aconites, often 4 inches long, and an inch or more in diameter, prominently wrinkled, and not uniformly reddish-brown in color, the edges of the folds being whitish; while Japanese aconite is much smaller, 1 to 2 inches long by about  $\frac{5}{8}$  of an inch in diameter, but little wrinkled, and of a uniform brown color.—Amer. Jour. Pharm., April, 1896, 191-192.

*Hydrastis Canadensis—Presence and Amount of Free Alkaloid (Hydrastine) in the Rhizome.*—In a paper read before this Association at Asheville (see Proceedings, 1894, 190), Alfred R. L. Dohme called attention to the probable presence of hydrastine in the free state in the roots of *Hydrastis canadensis*, because on treatment with neutral solvents in the cold, for instance with benzol, the solvent left hydrastine as residue of evaporation. The author, in conjunction with Hermann Engelhardt, has now made experiments upon dry and fresh rhizomes, and finds his supposition to be correct. By treating the dried rhizomes successively with benzol and with a mixture of benzol and ether, they obtained 0.485 per cent. of hydrastin from a sample which by Keller's method (see Proceedings 1895, 546), yielded a total of 2.62 per cent. The amount of free hydrastine was therefore 18.5 per cent. of the total. In fresh rhizomes the percentage was still greater, amounting to 31.7 per cent. Incidentally, the authors have experimented upon the relative adaptability of Keller's and Linde's method (Pharm. Centralh., 1895, No. 25), for the estimation of hydrastine, and give the preference to Keller's.—Pharm. Rundschau., Oct., 1895, 235.

*Delphinium Lalil—Value of the Flowers as a Dye.*—The yellow flowers of this plant, which are collected in Persia and Afghanistan for dyeing silk yellow, have been shown, according to "Journ. Soc. Chem. Ind.," to have only about half the coloring power of the flower buds of *Sophora*, and less than half the dyeing power of quercitrin. On the other hand, the yellow

color is much purer, *i. e.*, less orange, than that yielded by the quercitrin—Pharm. Journ., Aug. 31, 1895, 191.

#### MAGNOLIACEÆ.

*Magnolia*—*Interesting Markings on Stems*.—Clement B. Lowe calls attention to some interesting markings found on some stems of *Magnolia* (unknown species) and exhibits them in a photolithograph accompanying his paper. These markings, caused by the axillary buds with the scars of the detachment of the petioles of the leaves beneath them, resemble in a remarkable manner the wrinkled face of an old man, surmounted by a bishop's mitre, the latter being formed by the axillary bud, while the eyes and nostrils were made by the vascular bundles, which ran from the stem into the petioles of the leaves.—Amer. Jour. Pharm., April, 1896, 191.

#### MENISPERMACEÆ.

*Calomba*—*Isolation and Characterization of Proximate Constituents*.—The proximate constituents of colombo root heretofore determined are colombin, columbic acid, and berberine, but neither of the two first named appears to have been isolated in an absolutely pure condition, and there is therefore considerable confusion respecting their chemical constitution and relation. A. Hilger has now succeeded in preparing these two bodies absolutely pure. To obtain the

*Colombin* the drug was repeatedly extracted by boiling ether, which on cooling deposited the bitter principle faintly yellow in color and contaminated with a little fat and cholestrin. By washing them with cold alcohol and recrystallizing from boiling alcohol, the colombin was obtained in form of white needle-shaped crystals (belonging to the orthorhombic system, according to G. Rose), which are insoluble in water either cold or hot, and also insoluble in cold ether or cold alcohol, but are readily soluble in the last two solvents as well as in chloroform at the boiling point. It reacts neutral, melts at  $182^{\circ}$ , and has the composition  $C_{21}H_{24}O_7$ —that given by its discoverer, Wittstock, being  $C_{21}H_{22}O_7$ , while Flückiger assigned to it the formula  $C_{22}H_{24}O_{14}$ . When heated with caustic alkali solution, or with hydrobromic, hydriodic or hydrochloric acid, it is converted into a monobasic acid, which is identical with the

*Columbic acid* naturally existing in the drug. To obtain this from the drug, the residue remaining after the extraction of the colombin by ether is exhausted by boiling with 90 per cent. alcohol, the alcohol is recovered by distillation, and the extract boiled with thin milk of lime. A soluble lime salt of the acid is held in solution in this filtrate, from which crude columbic acid is precipitated by hydrochloric acid. The precipitate is washed with water until the washings no longer give a berberine reaction—formation of a red zone upon dropping chlorine water into the solution acidulated with hydrochloric acid—and it is then washed with boiling ether to remove

traces of colombin. The acid is finally redissolved in dilute potassium hydrate, reprecipitated by hydrochloric acid, and washed with water. Pure columbic acid so obtained is a yellow amorphous powder, which afterwards becomes brownish. It has the characteristic odor of colombo, insoluble in water and in ether, but easily soluble in hot alcohol. Its alkaline solutions have a deep brown color. Elementary analysis points out the formula  $C_{21}H_{21}O_6 + H_2O$ , in salts that are dried at  $100^\circ$ ; but it loses the molecule of water when heated to  $130^\circ$ .—Zeitschr. (Est. Apoth. Ver., 1896. No. 1, 8-14.

*Calumba—Fluorescent Principle.*—Alex. Gunn observes that the apparent turbidity of preparations of calumba is due to fluorescence, such preparations being perfectly brilliant by transmitted light. He has obtained a solution of the body causing this fluorescence by acidifying the tincture with dilute hydrochloric acid, shaking with ether, separating the latter, treating it with purified animal charcoal, filtering, and carefully extracting with 1 per cent. ammonia solution. The ammoniacal solution being filtered, the fluorescence is seen distinctly.—Chem. and Drug., Dec. 14, 1896, 855.

#### RUTACEÆ.

*Jaborandi—Commercial Varieties.*—In consequence of the scarcity of jaborandi the varieties of this drug that enter into commerce are becoming more numerous than ever. E. M. Holmes, therefore, has prepared a paper in which he traces the history of jaborandi since its introduction into medicine. The name jaborandi appears to be applied in various countries in South America to a number of plants belonging to the *Rutaceæ* and *Piperaceæ*, hence we find that plants of both of these natural orders have been imported under that name. All of these plants, however, possess sialogogue properties, and are powerfully diaphoretic. The official jaborandi,

1. *Pernambuco Jaborandi*, was originally brought to Paris from Pernambuco by Dr. Coutinho, and identified by Professor Baillon (1874) as the leaflets of *Pilocarpus pinnatifolius*, described twenty years before by Lemaire. A comparison of the leaves of commerce with those of plants grown at Kew, revealed certain differences, which led Mr. Holmes to suggest that the former were probably derived from a different species, more nearly allied to *Pilocarpus sellonius*, though the fruit as well as flowers of the commercial jaborandi being unknown, the only evidence upon this point that could be offered was necessarily derived from the leaves and stems. In 1890 the author saw a jaborandi plant in the Botanic Garden at Cambridge which presented the same kind of leaf as the commercial drug; but when, in 1892, he secured a flowering herbarium specimen of this plant, it proved to be quite distinct from *P. pinnatifolius*, in that the leaflets were usually in four pairs, in the yellowish flower deeply suffused



with rosy pink across the middle of the petals, and in the slender rachis. Mr. Holmes therefore described the plant as a new species under the name of *Pilocarpus jaborandi*, and as the source of *Pernambuco jaborandi*, though the chain of evidence is not complete, since he has not yet seen the fruit of the Cambridge plant.

2. *Piper Jaborandi*.—The leaves and roots of a species of *Piper* were exported from Brazil under the name of jaborandi shortly after the introduction of *Pernambuco jaborandi*, probably in consequence of an account of a jaborandi which Dr. Domingo Parodi (1875) referred to *Piper jaborandi*, Vell. Four other species of *Piper*, viz., *P. reticulatum*, Lin., *P. citrifolium*, Loun., *P. nodulosum*, Link (= *P. unguiculatum*, Ruiz and Pavon), and *P. mollicomum*, Kunth. (= *Artanthe mollicomum*, Mig.), are also said to be used under the name of jaborandi; but the leaves of these false jaborandis cannot well be confounded with those of any known species of *Pilocarpus*, being thin, papery, grayish, tapering equally to both ends, and have not the large oil cells characteristic of the *Rutaceæ*. The leaves of these false jaborandis are generally found in commerce mixed with portions of the stems, which exhibit the curious enlarged nodes characteristic of pepper stems, and the equally remarkable stem structure.

3. *Paraguay Jaborandi*.—Shortly after the introduction of *Pernambuco jaborandi* a plentiful supply of jaborandi leaves reached the markets from Paraguay via Rio Janeiro and Buenos Ayres. These leaves differed from the *Pernambuco* variety in having rather thinner leaflets, of which they had only two or three, and never four pairs. It was also inferior in alkaloidal content. Comparison with the leaves of a growing specimen of *Pilocarpus pinnatifolius*, Lem., seems to point out its identity with that species, which grows abundantly in Paraguay, this view being further supported in that the cultivated specimen also was inferior to the *Pernambuco jaborandi* in alkaloid. Mr. Holmes therefore proposes the name *Paraguay jaborandi* for this variety, but observes that it is not found in commerce uniform in character. There are thin leaves tapering to the base, with the veins on the upper surface prominent, and there are others less tapering at the base, with veins slightly prominent. The latter agrees closely with a tree-jaborandi, described by Gibert as being a large Paraguayan tree named "Arbe d'assez grande taille," whose leaves approach in shape more nearly to the oblong-oval form of *Pernambuco jaborandi*, from which they differ in being thinner, less prominently veined, and in having a grayish-green color. The designation,

4. *Maranham or Small Jaborandi* is proposed by the author for a kind of jaborandi which had been imported into Liverpool, and described by T. Wardleworth in 1893. This differed from all the known species in having very small leaves, as small as those of *Xanthoxylum*, but now identified as a new species of *Pilocarpus*, to which Dr. Stapf gave the specific name of *microphyllus*, as it has the smallest leaves of any known *Pilocarpus*. It is rich in alkaloid easily extracted.

5. *Ceará Jaborandi* (*Pilocarpus trachylophus*).—This variety of jaborandi made its appearance in London in 1894. It differs from any previously seen in the dark brownish-green tint of the upper surface of the leaves, and the yellowish tint of the under surface, which was covered with short curved hairs. The fruit differed from any known species in the warty character of the ridge at the back of the carpels, on account of which peculiarity he had proposed for it the specific name of *Pilocarpus trachylophus*. The fruits have a very short pedicel, and the leaves only two pairs of leaflets.

6. *Aracati Jaborandi* (*P. spicatus*?).—Recently, for the first time, a simple leaved species of *Pilocarpus* has made its appearance in the market, which, though not identical with any known species, comes very near to *P. spicatus*, from which it differs chiefly in the firmer consistence of the leaves, their smaller size, less prominent veins on the upper surface, and longer pedicel of the fruit. The leaves are about the size and very like in shape to those of *Laurus nobilis*, the upper surface polished, and the veins scarcely visible, but more so on the under surface. Their texture is papery, rather rigid, brittle, dark brownish green above, and of a paler hue beneath. They are sometimes mixed in commerce with the leaves of *P. microphyllus* and *P. trachylophus*.

The distinctive commercial names that have been applied by the author to different kinds of jaborandi must not be taken to indicate that the leaves come only from these provinces. *P. jaborandi*, *P. trachylophus*, and *P. microphyllus* have all been imported from Maranhão and Ceará, and the last named has also been sent from Rio Janeiro, while *P. pinatifolius* extends from São Paulo to Paraguay. At present, we do not know exactly where the plants are collected, but only the ports from which they are shipped. Moreover, our knowledge of the distribution of the Brazilian species is very imperfect, as well as our botanical knowledge of the number of species and the character of their fruits.—Pharm. Journ., Dec. 21 and 28, 1895, 520–522 and 539–541.

*Ailanthus Excelsa*, Roxb.—*Chemical Examination of the Bark*.—David Hooper having been supplied by Dr. Watt, of Calcutta, with an authentic sample of the bark of *ailanthus excelsa*, Roxb., has subjected it to examination in order to confirm, if possible, the presence of ailanthic acid described by Mr. Narayan Daji, of Bombay, in 1870. The bark was in flattish pieces about 6 inches long, 3 to 4 inches wide, and  $\frac{1}{2}$  inch thick; light colored and granular in texture; externally hoary and rough, internally yellowish-white and finely fibrous; of acrid, mawkish odor, and very bitter taste. It yielded 7.4 per cent. of ash, and contained *no* tannin, which is contradictory to the statement of Dr. Mohideen Sheriff in his "Materia Medica of Madras," that a decoction of the bark blackens the persalts of iron. After an unsuccessful search for ailanthic acid, the author obtained a neutral, intensely bitter substance, producing fluorescent solu-

tions, precipitable by tannin, and evidently related to quassiin and other neutral bitter principles found in many plants of the *Simarubaceæ*. It was obtained by precipitating an aqueous solution of the alcoholic extract with tannin, washing the precipitate, mixing it with fresh lead hydrate, drying, exhausting with alcohol, and evaporating the alcoholic solution. The evidently only partially pure substance was not distinctly crystalline, of a light brown color, soluble in water, alcohol, and in chloroform, but insoluble in ether. It produces a purplish color with strong sulphuric acid.—Pharm. Journ., Oct. 26, 1895, 345.

*Ailanthus Glandulosa*—*Occurrence of Tubercles on the Roots*.—E. Andr   has discovered numerous tubercles upon the roots of *Ailanthus glandulosa*. They were outgrowths of irregular shape, varying from 5 to 40 Mm. in diameter, and had a scabrous, almost warty surface. Most frequently they were grown together in clumps of three or more. The author considers them to be nearly identical with the tubercles on *Crat  gus prunifolia*, described by Brunchorst. The development of the tubercles was especially frequent whenever the roots struck sterile layers of sand, and were thus at once deprived of their usual nourishment. Presumably, therefore, the cause of their formation may be found in purely external conditions. An old tubercle is said to show distinctly the original structure of the root, though the deformation is often so great that longitudinal and transverse sections are almost alike.

#### BALSAMINACE  .

*Impatiens Fulva*—*An Antidote to Rhus Poisoning*.—An anonymous correspondent of the "New York Sun" states that the plant, called by some people *ceroline*, by others the *silver plant*, is a never-failing remedy in the treatment of ivy-poisoning. The stalks can be crushed, and the juice being rubbed upon the poisoned surface, immediate relief follows; or the surface may be bathed with equally good results with a tea made from the stalks. The plant is the *Impatiens fulva*, a species common in wet ground in the South, and is familiarly known as "touch-me-not," the name being derived from the sudden bursting of the seed pods when touched or slightly pressed with the hands. Other names for the plant, which has small, orange-spotted flowers, are "jewel weed," or "balsam" or "silver-leaf."—Amer. Drugg., Oct. 10, 1895, 217.

#### STERCULIACE  .

*Cacao*—*Cultivation in Trinidad*.—Walter H. Ince gives an interesting account of the cultivation of cacao at the San Carlos estate, Trinidad. The cacao is a stunted tree, standing about twelve feet high, which grows best in shady places; hence wherever a plantation is started, the immortal, *Erythrina umbrosa*, a large tree with spreading umbrageous branches, is planted for its protection. The harvest of cacao goes on more

or less continuously, and pods in various stages of ripeness, from green to yellow and full ripe red, are on the trees at the same time ; but the principal harvest is in the spring and autumn. The pod grows direct from the stem—not from the ends of the branches—and when ripe it is severed from the tree with a dexterous whisk of a cutlass—never torn off—and immediately carried to square fermenting boxes, where they are cut open, the beans removed from their glutinous sweet-acid pulpy embedment, and allowed to ferment. During this process heat is developed, the outer integument becoming loose and falling off, and they are therefore removed from one fermenting box to another every two days, being finally after the fourth removal placed an inch thick on a flat shed to dry in the sun. Here they are “danced,” *i. e.*, coolies go through the beans with their bare feet to turn new surfaces to the action of the sun, and to rid them of the last remnants of membranous husk which partly adheres after the sweating process. During rain-fall the beans are covered with a sliding roof, for the effect of rain on them, as well as oversweating, which are by no means rare occurrences on estates where inadequate provision is made, is that the product darkens considerably and becomes lowered in value. To produce from such black beans a marketable article, they are “ochre-danced ;” a process which consists in stirring up the beans with a mixture composed of the glutinous exudation of a tree, called “*bois d’l’homme*,” the juice of bitter oranges and yellow ochre, and then exposing them to the sun and “dancing” as before. Good beans when dry are plump and round, show a characteristic color when broken open, and their market value depends on the peculiar shade of the husk and the “nibs”—the latter being the cacao from which the outer husk is removed.—Pharm. Jour., April 25, 1896, 322–323.

*Cacao—Method of Curing in Jamaica.*—W. Chadwick gives some information respecting the proper time of collecting and of curing cacao. It is important that cacao shall be quite ripe, but not over ripe. The pods must have attained their full color, but the beans must not shake about easily. In the unripe beans the mucilaginous matter covering them is not properly developed, while in the over-ripe beans the mucilage commences to liquefy. Great care must also be taken when removing the pods from the trees that they be cut off with a sharp knife, not pulled off, because it is essential that the little knob at the base of the stem of the pod remain uninjured, else the tree will not bear on the same spot the following year. An ordinary flour barrel, perforated in the bottom with about a dozen one-half inch holes, is the best vessel for fermenting the beans by a small cultivator. About ten inches of banana trash is placed in the bottom of this barrel, the sides are lined thickly with the trash, the beans, removed from the pods, are then placed in it, then covered with trash, and allowed to ferment during two days. One third of the beans are removed from the top, then the remainder are placed on a second pile, and the beans in both piles

are then well mixed separately. The barrel being provided with fresh trash as before, the beans are returned into the barrel, the one-third taken off first going to the bottom and the two-thirds on top. They are again allowed to ferment two days, when the same treatment is repeated, and they are left to ferment two days more, when they are removed, washed, and dried in the sun, getting the full benefit of the sun during the first day by beginning early, but avoiding the extreme heat of the midday sun after the first two days' drying.—Am. Jour. Phar., Oct., 1895, 530-532; from Bull. Dep. Publ. Gardens and Plantations, Jamaica.

*Chocolate—Microscopic Testing.*—The following method for the microscopic examination of chocolate is given in Pharm. Centralh. (Sept. 26, 1895, 553) from Soc. Chim. du Nord de la France: About 1 Gm. of the chocolate is finely powdered, extracted several times by decantation with ether to remove the fat, then once by decantation with 20 Cc. of water to remove the sugar. The residue may then be examined at once under the microscope.

*Kola—Precaution Necessary to Extract its Glucosidal Constituent—Kolanin, Unchanged.*—Fred B. Kilmer, after reviewing the history of kola from a pharmacological and chemical standpoint, communicates the results of his own experiments with this interesting drug, which he has had opportunity to study in its native habitat. According to the most recent examinations, the seeds contain besides a considerable percentage of caffeine and some theobromine, a peculiar glucosidal body to which the name

*Kolanin* has been given, and which, it is stated, is readily split up into glucose, caffeine and a tannin-like body by the action of a peculiar ferment existing in the fresh seeds, which has received the name of

*Kolazym*, and which appears to manifest its activity upon the kolanin when the latter is exposed to the action of the air, as is inevitably the case when the cells enclosing it are ruptured during the chopping up or crushing of the undried nuts. The activity of the ferment is also exercised when the nuts are exposed to heat, as in the process of drying, and for this reason the dried, or partially dried, nuts will be deficient in the glucoside kolanin, while the amount of alkaloidal constituents will be increased. When engaged in his experiments in the habitat of the plant, he pursued a crude method of working up the undried nuts, which consisted in chopping them up finely *under ether*, so as to exclude the air, then, after allowing the ether to partly evaporate, to extract both the nut and the ethereal residue with chloroform. In the chloroform extraction the caffeine was to be found; in the ethereal solution, the kolanin. So far kolanin appears not yet to have been obtained in an entirely pure condition, but all authorities appear to attribute to it physiological activity distinct from that of the alkaloidal constituents of the drug. Knebel, who has perhaps made the most accurate study of this glucoside, has demonstrated that it is easily

split up into glucose, caffeine, and a third product, a non-nitrogenous coloring matter, which he named *kola-roth* (kola-red). This must not be confounded, however, with the *kola rouge* of Heckel and Schagdenhauffen, which appears to have been the glucoside kolanin itself. Knebel has, furthermore, demonstrated that the glucoside is not alone split up into its components by the prolonged action of boiling water, or dilute sulphuric acid, and by the action of the ferment, kolazym, but also when it is kept at a temperature of 60°–70° C. for twenty-four hours, as well as by the action of the ferments of the saliva and of the gastric juice.—Amer. Jour. Pharm., Feb., 1896, 96–111.

*Kola—Determination of Kolanin, Caffeine, etc.*—J. Jean has determined the proportion of kolanin and caffeine (including theobromine) in various samples of kola seeds, as well as in certain galenical preparations. The alkaloids were determined by the lime and chloroform method, but the method for determining the kolanin is not given. The best seeds were from Sierra Leone, which contained as much as 2.4 per cent. of caffeine and theobromine and 1.2 per cent. of kolanin. The author recommends

*Tincture of Kola* as being the best preparation, since it contains practically all the kolanin together with the greater part of the alkaloids, and he lays particular stress upon the presence of kolanin by reason of its decomposition in the stomach and consequent presentation in a nascent condition. Of the

*Extracts of Kola* examined, that prepared according to the directions of the Codex alone represents the drug, and such an extract should be the only one used for the preparation of a liquid extract.—Pharm. Jour., Feb. 26, 1895, 164; from Rep. de Pharm. (3), vii. 49.

In a subsequent paper, Mr. Jean gives the following method for the quantitative determination of

*Kolanin* from kola and its preparations. By treatment with lime and chloroform, the caffeine and theobromine are first separated. The residue is then extracted with 90 per cent. alcohol in a Soxhlet apparatus, and the alcohol distilled off from the solution containing kolanin, tannin, and coloring substances. The residue is treated with water, which leave kolanin undissolved, and after washing with warm water it can be dried and weighed.—Pharm. Jour., March 28, 1896, 243; from Rep. de Pharm. (3) viii, 99.

*Kola Nuts—Comparative Assay of the African and Jamaica Sorts.*—Alfred R. L. Dohme and Hermann Engelhardt have made comparative assays of African and Jamaica kola nuts, employing two methods: the one similar to that of Schlotterbeck and Knox (see Proceedings 1895, 334–338), which consists in the extraction of the drug with chloroform; the other, a method of their own, which depends upon the extraction of the

nuts with  $33\frac{1}{3}$  per cent. alcohol, and is carried out as follows: The powdered nuts are boiled in an Erlenmeyer flask with an inverted condenser or long tube attached, on a water-bath for three hours, with a mixture of two parts of water and one part of alcohol by volume. Part of the starch will, of course, be hydrolized, but not sufficient to render filtration impossible. After cooling, the contents of the flask are filtered, the filtrate evaporated nearly to dryness in a porcelain dish on a water bath, the still moist residue is mixed with calcined magnesia and sand, and evaporated to complete dryness, stirring carefully and frequently. The dry powder is then boiled with chloroform for half an hour in an Erlenmeyer flask, provided with a reversed condenser, on a water bath; the contents of the flask are allowed to cool, and are then filtered into a tared flask. The chloroform is distilled off, the flask is heated on a water-bath at  $100^{\circ}\text{C}$ ., and weighed, and the excess of weight over the tare of the flask taken as the weight of the caffeine in the sample.

In this manner the amount of caffeine in African kola nuts was determined to be 2.24 per cent., whilst Jamaica nuts yielded only 1.93 per cent. The method of Schlotterbeck and Knox gave for the African nut 2.04 per cent., and for the Jamaica nut 1.75 per cent. These figures indicate that African kola nuts, though not prepossessing in appearance, being smaller and darker than Jamaica nuts, and more shriveled and less perfectly cured than these, are richer in caffeine than the handsomer and more expensive West India nuts. Also, that the method employed by the authors secured a larger yield of caffeine. The nuts employed in these experiments were typical samples of each kind. The authors also mention that the extract obtained from the Jamaica nuts was of a color resembling tea infusion, whereas that from the African nuts resembled an infusion of coffee in color.

5. *Kola—Estimation of Alkaloid, etc., in Commercial Samples.*—Nathan L. Thompson has estimated the total alkaloids and the tannin of four commercial specimens of kola. The tannin was estimated by the gelatin and alum method. The alkaloids by three different methods, viz.: (1) extraction with chloroform, treatment of the chloroform extraction with acidulated water, rendering the watery liquid alkaline, shaking out with chloroform, etc; (2) Extraction of the drug with acidulated water, rendering the watery extract alkaline, and shaking out with chloroform; (3) By Lloyd's process with ferric hydrate. In all cases the crystals of the alkaloids obtained were pure white in color. The results are given as follows:

Specimen.	Condition.	Moisture.	Ash.	Tannin in	
				Original Dry.	Absolutely Dry Drug.
1	Dry .....	7.55	3.19	1.73	1.87
2	" .....	6.95	2.20	1.73	1.86
3	Fresh .....	56.65	3.66	1.24	2.85
4	Partly dried.....	38.50	3.66	1.52	2.47

## TOTAL ALKALOIDS.

Means of Extraction.	Specimen.							
	Original Dry.				Absolutely Dry Drug.			
	1	2	3	4	1	2	3	4
Chloroform .....	1.00	.55	.80	.75	1.08	.59	1.84	1.22
Acidulated water.....	1.35	.75	.85	1.00	1.46	.80	1.96	1.62
Lloyd's process .....	1.35	—	.75	—	1.46	—	1.73	—

*Fresh Kola Nuts—Extraction by Different Menstrua.*—J. Henry Schroeder communicates the results of assay of the extractions of fresh kola nuts made by Prof. Frank G. Ryan with different menstrua. The process of extraction consisted in macerating 100 Gm. of the finely sliced drug during four weeks in 202 Cc. of the following menstrua :

I. 200 Cc. of alcohol and 2 Cc. of acetic acid.

II. 200 Cc. of diluted alcohol and 2 Cc. of acetic acid.

III. 160 Cc. of alcohol, 40 Cc. of glycerin, and 2 Cc. of acetic acid.

The resultant extractions were reddish brown, that obtained by menstruum II. being somewhat darker in color than the others, and they all had an astringent taste, characteristic of kola nut. I. and II. remained clear, but III. showed signs of cloudiness and deposit upon standing about a weeks. Duplicate assays were made by Lloyd's method, with results showing a decided advantage by the use of the diluted alcohol, Extraction II. yielding an average of 0.88 per cent. of total alkaloids (purified), whilst Extractions I. and III. yielded 0.69 and 0.77 per cent. respectively. Experiments made to determine whether the yield of alkaloid had been affected by the necessary treating with an inorganic acid resulted in the negative.—*Amer. Jour. Pharm.*, May, 1896, 254-255.



## TERNSTROEMACEÆ.

*Tea—Determination of Caffeine.*—A. Petit and P. Terrat observe that when dried tea is treated with chloroform but a small proportion of the caffeine present is removed, in spite of the great solvent power of the liquid for the alkaloid, and it appears to be with the view of obviating this difficulty that certain chemists have recommended the addition of lime or magnesia to remove the caffeine from its natural combination. Commaille, amongst others, makes the tea and magnesia into a stiff paste, which is left to itself for about twenty-four hours, then dried on a water-bath, and exhausted with chloroform. This process, however, in the experience of the authors, is far from giving exact and concordant results, and similar observations have been made by Paul and Cownley, whose experiments seem to show that magnesia, and more especially lime, possess the property of retaining caffeine when chloroform is the solvent, on which account they have suggested that alcohol be used in place of chloroform. The present authors, however, find there is no advantage in using 98° alcohol, though they have obtained very satisfactory results with 60° and 80° alcohol. They have found, furthermore, that the caffeine does not form with lime or magnesia compounds insoluble in chloroform, having demonstrated this fact by operating upon mixtures of the pure substances. On the other hand, they find that the caffeine is readily and completely extracted from tea by either alcohol of 60° or 80°, or by chloroform, if the tea is in a moist or a damp condition, and they are convinced that the caffeine is dissociated from its natural combinations by the simple action of water, and again united when the tea is completely dried: this taking place if water alone has been used as well as when the leaves have been treated with magnesia, or lime, or, as suggested by the process of Grandval and Lajoux, if the substance has been treated with ammonia before drying. They maintain, and are supported in their opinion by experimental data given, that to effectively extract the caffeine the tea must be damp or moist, and that the results are no better when the alkali or alkaline earths are used under the mistaken idea that the caffeine is thereby separated, which it is not; and they recommend the following process, which A. Petit in 1877 had published in conjunction with Legrip: 25 Gm. of powdered tea is treated with three times its weight of boiling water, and left in contact with it for a quarter of an hour, with occasional agitation. The mixture is evaporated until the tea is just damp, and then extracted with chloroform by percolation until some of the residue left by the chloroform, when dissolved in boiling water, gives no opacity on addition of solution of tannin to the filtered solution. The chloroform being distilled off, the residue is dissolved in boiling water and the filtrate evaporated in a water-bath. Usually the caffeine so obtained is sufficiently pure to be weighed and calculated as such. Otherwise the adhering impurity (chlorophyll) may be

removed by the method of Grandval and Lajoux: the impure caffeine is dissolved in the cold in 15 Cc. of ten per cent. sulphuric acid, the solution filtered after standing for some time, the liquid neutralized with ammonia, shaken out with chloroform, the chloroform solution evaporated at a very low temperature, and the residue weighed as pure caffeine.—Pharm. Jour., June 13, 1896, 461-462; from Jour. de Phar. et de Chim., June 1, 1896.

*Tea—Determination of Caffeine.*—E. H. Gane reports on the examination and methods of examination of various commercial samples of tea. He finds the most satisfactory process to be that advanced by Allen in a paper read before the British Pharmaceutical Conference in 1892. Mr. Allen had found that aqueous solution of caffeine may be evaporated to dryness at 100° C. without loss, that boiling with magnesia does not decompose the caffeine, but that boiling it with lime does decompose it, and that, therefore, all processes based upon boiling tea with lime are valueless. The most satisfactory process, which is also recommended by Mr. Gane, consists in boiling tea with water for six hours, filtering, precipitating the coloring matter with lead acetate, evaporating the filtrate to a small volume, removing the excess of lead by sodium phosphate, and shaking out the solution four or five times successively with chloroform. The author furthermore finds the statement of Dr. Paul that water would not extract all the caffeine under the conditions named inaccurate, and he gives the results of the assay of twelve samples of different teas by both processes, which uniformly gave higher percentages of pure caffeine by Allen's than by Paul's process. The latter consists in treating the tea with magnesium oxide and subsequent exhaustion with alcohol, etc. In his present experiments he had boiled the tea by Allen's process eight hours instead of six. The yields of caffeine varied from 1.70 to 4.12 per cent., the average of the 12 samples being 3 per cent.—Amer. Drugg., Jan. 25, 1896, 43; from Proc. Amer. Chem. Soc., Jan. 20, 1896.

#### GUTTIFERÆ.

*Siam Gamboge—Source and Method of Collection.*—From a recent report on the trade of Siam for the year 1893 (Annual Reports, 1895, No. 1,520), published by the British Foreign Office, it appears well established that the tree yielding Siam gamboge is

*Garcinia Hanburii*, Hook, f., specimens of the leaves of gamboge trees, collected on the spot by Mr. Beckett, leaving little doubt on this subject. The tree is found on the islands east of the Gulf of Siam, as well as on the mainland of Cambodia and Cochin China, and it yields, together with the closely related species, *G. Morella*, Desrouss., of Ceylon and India, practically the whole of the gamboge of commerce. The reporter (Mr. Beckett?), gives an interesting description of the tree and the method of collecting the resinous product in the localities visited by him. It appears to be indigenous only in the islands and the seacoast of the Gulf of Siam,

lying between the tenth and twelve degrees of north latitude, the heavy rainfall of this coast being apparently necessary to the existence of the trees. It is known locally as "Ton Rong," grows to the height of some fifty feet, and is straight stemmed with no lower branches, owing probably to the dense shade of the forests in which it grows. None of the trees met with had a diameter of more than twelve inches. Ten years' growth is said to be required before the tree is ready for tapping, which is carried on during the rainy months, from June to October. This is done by cutting a spiral line around the trunk from a height of some 10 feet downward to the ground, and collecting the sap, which trickles down the grooves so made in a viscous stream, in hollow bamboos. From there it is decanted into smaller bamboos, in which it is left for about one month to solidify. To remove the gamboge, the bamboo is placed over a red-hot fire, when the bamboo husks crack off, and leave the article known as "pipe" gamboge. The trees can be tapped two or three times during one season. Care must be taken to prevent the rain water from mixing with the resin in the grooves, as the water causes honey-combing and black discoloration, and a consequent depreciation in value. The whole output is sold to the local Chinese traders and taken to Bangkok.—*Amer. Jour. Pharm.*, Oct. 1895, 521-522; from *Kew Bulletin*, June and July, 1895.

#### AURANTIACEÆ.

*Lemons—Quantity of Citric Acid in Juice.*—H. H. Robins has had exceptional opportunities of examining lemon juice since 1888, and reports the results of his examination of lots representing large consignments of lemons during years from that time to 1896. He observes that in the B. P. of 1867 lemon juice was official if it contained  $32\frac{1}{2}$  gr. of citric acid in the fluid ounce, but that this standard has been raised in the present edition to between 36 and 46 grains. In looking for an authority for this increase, among the many he has found only one experimenter, Mr. Stoddart, who had obtained from the mixed juice of eight lemons 40 to 46 grains of citric acid per ounce, and reported his observations to the Brit. Pharm. Conference in 1868. In all other cases the amounts observed were below 40 grs., the best from 37.5 to 38.5 grs., and most of them between 30 and 36 grains per fl. oz. The results of all these experimenters—with the one exception mentioned—agree with his own experience that the official standard is much too high, and this opinion is substantially corroborated by the following particulars of his work:

*Method of taking Samples for Analysis.*—In the seasons from 1888 to 1896, samples of juice were always taken the same day as the fruit was pressed, and each represented about 900 gallons, or an average of a shipment, so that the average of the season is equivalent to the total shipment. The juice was then set aside for twelve hours, in order that most of the flocculent matter would subside; the supernatant liquid was then filtered through paper, and subjected to the following

*Method of Analysis.*—The specific gravity was taken at 15° C., and the quantity used was either the calculated weight of a fluid ounce, or a definite volume in Cc. The juice, after dilution with water, was titrated with normal soda solution, with phenolphthalein as indicator. Following Warington's method, a quantity of the soda solution was run in that represented a little less than the required quantity; the whole was then boiled, and when quite cold, the titration was completed. The end of the reaction is very well marked; a slight correction was made to allow for the alkaline condition of the titrated juice. All the activity was calculated as citric acid,  $\text{H}_3\text{C}_6\text{H}_5\text{O}_7, \text{H}_2\text{O}$ , for the organic acids, other than this, do not amount to more than 1 per cent. Remembering that "the season" relates only to fruit that arrives in December and January, the following is the

AVERAGE OF THE SEASONS FROM 1888-1896 INCLUSIVE.

	Sp. Gr.	Grains Citric Acid per. fl. oz.
1888 .....	1.040	35.0
1889 .....	1.038	33.5
1890 .....	1.043	35.5
1891 .....	1.041	35.0
1892 .....	1.040	35.0
1893 .....	1.042	36.0
1894 .....	1.044	36.9
1895 .....	1.042	34.9
1896 .....	1.043	36.1

Not wishing to rely solely on the juice squeezed by his own firm, the author obtained six samples of the produce from three other London houses for the season of 1895. The average was 35.4 grains of citric acid. Again, the average acidity of juice from Messina fruit from March 7 to December 23, 1895, was 33.32, calculated from the monthly average, and from Palermo fruit it was 33.4 grains per fl. oz.; while the average of all fruits from the beginning of 1895 to February, 1896, was 35.23 grains. Finally, the author observes that lemon juice loses a little acidity in keeping, a sample assaying in February, 1892, 36 grains, giving only 33.8 grains in November, while another assaying 36 grains in February, 1894, assayed only 35.5 in July of the same year. The author suggests in consequence of these and other confirmatory observations, that the B. P. standard should be altered to 33 grains of citric acid and upwards per fluid ounce.—Chem. and Drugg., May 23, 1896, 742-743.

*Shaddock and Forbidden Fruit—Historical Review, Botanical Characteristics, etc.*—Chas. H. LaWall has contributed a valuable paper in which he extensively reviews the history and botanical characteristics of the shaddock or grape fruit—*Citrus decumana*—as well as of other members of the citrus family, and particularly of the so-called Adam's apple or

forbidden fruit—*Citrus paradisi*, which has also been known by the vernacular of "grape fruit," and is consequently sometimes confounded with the shaddock. A comparison of the botanical characters of the two plants, which are given side by side, makes it evident that considerable difference does exist between them. But the literature on the subject is contradictory in many respects. In the ancient description of "forbidden fruit" no mention is found of a pear-shaped fruit, while that is the distinguishing character of that fruit as described at the present time. The term "grape fruit" was formerly used to denote a fruit of entirely different appearance, while now it seems that it is a fruit closely resembling the "shaddock" in appearance, but still specifically different. The abundance of testimony, however, is in favor of the grape fruit and shaddock being different varieties of the same species in the Northern markets; any difference which may exist is not noticed by the majority of persons who eat the fruit, and is apparently much slighter than is the case with the number of varieties of the orange with which we are familiar. In both species of citrus there are two varieties of fruit known, the globular and the pear-shaped, and both in the forbidden fruit and in the shaddock, the pear-shaped variety possesses the most of the sweet principle, and is a preferable fruit.

The author had opportunity to examine a globose shaddock of extra large dimensions. It weighed 3,118 grammes, yielded 1,200 Cc. of juice, having a spec. grav. of 1.0319 and containing 2 per cent. of reducing sugar. Smaller fruits were also examined, the sp. gr. of the juice being in two examples 1.040 and 1.0425, and the amount of reducing sugar 3.84 and 3.57 per cent. respectively. The flavor of the larger specimens—which also contained less acid—was inferior to that of the smaller specimens. A syrup made by using the juice and peel in the same manner as in the preparation of lemon syrup, had an agreeable aromatic flavor, agreeably acid, with a not unpleasant bitter taste. The present paper is illustrated by two handsome photolithographs, showing the shaddock tree in fruit and a single branch of the tree.—*Amer. Jour. Pharm.*, March 1896, 121-130.

#### VITACEÆ.

*Wines—Limits of Volatile Acidity.*—H. Jay finds that the proportion of volatile acids found in French and Spanish wines of reliable origin oscillates between 0.38 and 0.80 Gm. per litre, calculated as monohydrated sulphuric acid. On the other hand, all Algerian wines which have been examined by him contain at least 1.30 Gm., and in a majority of cases exceeding 1.60 Gm. per litre.—*Chem. News*, Oct. 25, 1895, 209; from *Bull. Soc. Chim. de Paris*, No. 12, 1895.

*Wines—Recognition of Alum.*—M. Georges proposes to examine wines for alum by the aid of the two following solutions: 1. *Solution of tannin*, con-

taining 3.40 Gm. of *pure* tannin in enough distilled water to make 100 Cc., each Cc. of which precipitates 0.005 Gm. alumina (= 0.0463 Gm. of alum). 2. *Solution of Sodium acetate* in distilled water, containing 24 Gm. of neutral crystalline sodium acetate in 100 Cc., each Cc. of which contains combined acetic acid corresponding to 0.10 Gm. of monohydrated sulphuric acid. To make the test the author measures 20 Cc. of wine into a wide test-tube, and adds 2 Cc. of the solution of tannin. After agitation, he adds to the mixture 3 Cc. of the solution of sodium acetate, stirs again, and then leaves the mixture to settle. If, after five minutes, there appears a clotty precipitate, the presence of alum may be assumed; but if the wine remains clear, or is at the most slightly cloudy, the wine is genuine, or contains less than 1 decigr. of alum per litre.—Chem. News, Oct. 25, 1895, 209; from Bull. Soc. Chim de Paris, xiii-xiv, No. 13, 1895.

*Wines—Determination of Tannin.*—E. Manceau employs the following method for determining the tannin in wines: About 100 Cc. of wine are placed in a small flask with a ground glass stopper, together with 1 Gm. of gut-string. (The gut-string is prepared for the purpose from uncoiled violin strings, by submitting them successively to prolonged washing with alcoholized water, acidulated water, and pure water, until they no longer yield to these solvents any substance capable of reducing permanganate in the cold.) In a week all the tannin will have been taken up. The wine is then titrated with a solution of permanganate, 1 Cc. of which corresponds to 0.2 Gm. of pure gallo-tannin, using as indicator a sulphuric solution of indigotin. The difference of the volumes of permanganate required to decolorize a given volume of the untreated wine and of the treated wine gives the weight of gallo-tannin in the wine by simple calculation.—Chem. News, Nov. 29, 1895, 269; from Compt. rend., Nov. 4, 1895.

*Wine—Determination of Coal Tar Colors.*—Sostegni and Carpentieri recommend the method of Arata in the following form for the detection of coal-tar colors in wines: 200 Cc. of the wine are heated to evaporate the alcohol; then 2 to 4 Cc. of 10 per cent. hydrochloric acid are added, a few threads of absorbent (de-fatted) wool are introduced into the liquid, and the heating is continued for five minutes. The wool is removed, washed with pure water, then with hot water acidulated faintly with hydrochloric acid, and again with pure water. The coloring matter is now extracted from the threads by boiling them in 50 Cc. of water and 2 Cc. ammonia; the filtrate is acidulated, and fresh woollen threads are introduced, which, when dry display varying colors, according to the coal-tar color present, viz.: Rose-red to violet, with vinolin and with Bordeaux red; rose-red, with ponceau-red; faint red, with safranin; faint yellow, with tropæolin OO; faint orange, with tropæolin OOO; and dirty white, with fuchsin and with corallin. The method is applicable for the detection of all coal-tar colors with the exception of the last two named. The authors have applied it to 72 samples of *pure* Italian wines, and found them to communi-

cate to the wool a pure white, dirty white, yellow or faint red color.—Pharm. Centralh., Sept. 26, 1795, 554; from Rev. internat. d. falsific., 1895.

*Red Wines—Detection of Artificial Coloring Matter.*—In order to determine whether wines are artificially colored, Rinzaud treats 5 Gm. of the wine with 0.1 to 0.15 Gm. of sodium peroxide, which discharges all color completely within 20 minutes. The red color reappears, however, upon acidification with acetic acid in case the wine has been colored artificially, whilst the natural wine remains colorless.—Pharm. Centralh., Sept. 26, 1895, 554; from Annal. de Pharm., 1895.

*Wine—Determination of the Presence of Fluorine.*—The presence of fluorine in wine is determined, according to Nivière and Hubert, as follows: 100 Cc. of the wine are made faintly alkaline with soda solution, brought to the boiling point, and mixed with 2 to 3 Cc. of a 10 per cent. solution of calcium chloride. The precipitate is collected on a filter, which is incinerated with its contents, the ash triturated with one-third of its weight of *precipitated* silica, and this mixture is introduced into a test-tube containing  $\frac{1}{2}$  Cc. of a mixture of equal parts of Nordhausen and concentrated sulphuric acid. By the aid of a cork the test-tube is connected with a U-shaped bulb-tube (Will and Varrentrapp's), the middle bulb containing some water. On heating the test-tube, fluorsilicon is disengaged, and the water becomes turbid from the hydrofluosilicic acid formed.—Phar. Centralh., Sept. 26, 1895, 554; from Scientif. Moniteur., 1895.

#### POLYGALACEÆ.

*Polygala Senega—Proximate Analysis of the Root.*—With the view to throwing some further light upon the chemical constituents of seneka root, some of the soluble constituents of which are not yet accounted for, notwithstanding that a number of able analyses have been heretofore reported. J. Henry Schroeder has now made an analysis, following in the preliminary investigation Dragendorff's scheme, and making some special extractions and examinations, which he communicates in some detail, his results being tabulated as follows:

	Per Cent.	Per Cent.
Soluble in petroleum ether:		
Volatile oil.....	0.12	
Fixed oil.....	5.50	5.62
Soluble in concentrated ether:		
Resin.....	2.14	
Soluble in water.....	0.16	2.30
Soluble in absolute alcohol:		
Glucose.....	0.08	
Saccharose.....	0.50	
Impure polygalic acid and resin .....	5.98	6.56

	Per Cent.	Per Cent.
Soluble in cold distilled water :		
Glucose .....	2.68	
Saccharose....	5.32	
Mucilage .....	1.95	
Extractives (Saponin, etc.).....	4.07	14.02
Soluble in alkaline water (0.1 per cent. NaOH) :		
Pectin and albuminoids.....	18.40	
Extractive .....	2.16	1.60
Soluble in acid water (1 per cent. HCl.)		
Pararabin .....		20.56
No starch		
Lignin .....		11.60
Cellulose .....		19.39
Moisture .....		3.25
Ash.....		6.65
Loss .....		8.54
		<hr/> 100.00

An attempt was made to secure the saponoid principle, but the amount was too small to permit its purification. The mucilage, by the usual treatment, yielded crystals of osazone, and, by appropriate tests, the author also established the fact that pectin constituted only a small proportion of the alkali extraction. The author, furthermore, made several nitrogen determinations with the drug itself, and obtained concordant results in two combustions made with soda lime, while by Kjedadl's method his results were somewhat lower. These results indicate the presence of 22.50 per cent. of albuminoids, whereas he found only 18.40 per cent. of precipitable albuminoids and pectin in the alkaline extract; but he considers it likely that the discrepancy can be accounted for by the partial solubility of the albuminoids in the distilled water used previous to maceration in alkaline water, such solubility having been pointed out by previous investigators.—*Amer. Jour. Pharm.*, April, 1896, 178-183.

#### PAPAVERACEÆ.

*Opium—Successful Cultivation in Australia.*—It is stated in the *Agricultural Gazette*, of New South Wales, that the opium poppy can be successfully cultivated in that country, where, in favorable seasons, the plant will flower in about fifteen weeks from the time of planting. As soon as the flower falls the capsule is slightly cut on one side, in the afternoon, about four wounds being made. The milky exudation has hardened by the next morning, is scraped off with a blunt knife, and transferred to a clean tin vessel. The unwounded side is operated on the following afternoon.—*Amer. Journ. Phar.*, Oct. 1895, 539; from *Garden and Forest*.

*Australian Opium—Examination of a Sample Produced in Victoria.*—William Duncan has had opportunity to examine a sample of opium from poppies grown in Victoria. It resembled Smyrna opium in its general



character very closely, being wrapped in poppy leaves, but free from rumex fruits, and was characterized by extreme bitterness, breaking with a bright shiny fracture. By the B. P. process of assay it yielded 12.7 per cent. of morphine.—Chem. and Drugg., Dec. 21, 1895, 888.

*Bulgarian Opium—Analysis of Different Samples.*—At the Antwerp Exhibition there were two samples of Bulgarian opium from Karlovo and Varna, and probably these were the first of their kind publicly exhibited. The "Chemist and Druggist" (May 23, 1893, 733) remarks that the industry of cultivating opium in Bulgaria is a growing one, and deserves attention because the quality of the opium produced is exceptional. The following are results of analyses made in the official laboratory at Sofia :

Sample from :	Ash.	Volatile.	Soluble in Water.	Insoluble in Water.	Morphine.
Zlatitza .....	2.85	10.86	54.48	45.48	7.25
Lovotcha .....	2.36	10.39	67.61	32.39	11.90
Philippopol .....	2.57	11.65	73.90	26.10	11.07
Kustendie .....	2.69	7.65	70.69	29.30	19.15

The color of the Philippopol opium was chocolate brown, and it was hard on the outside. The other samples were coffee-brown in color.

*Persian Opium—Preparation.*—A recent Consular report gives some interesting information respecting the opium industry in Ispahan. The drug is there prepared under the direct observation of the native as well as European merchants. The collection begins early in May ; the capsules are lanced in the afternoon, and the opium collected on the following morning in copper pots. It is stored in large earthenware or copper pots until the united collection of a village or district is manipulated by experts so as to render it uniform in consistence and suitable for commerce. No additions of any kind seem to be made. It is shaped into cakes of about 1 lb. each, and assays as high as 12 per cent. morphine.—Pharm. Journ., April 15, 1896, 326.

*Chinese Opium—Character and Composition.*—Frank Browne states that in China, Indian opium is being displaced by Chinese opium, obtained from the province of Kwei-chou, Yunnan and Szechuen. *Kwei-chou opium* occurs in flat cakes weighing 1½ lb., wrapped in tissue and brown papers, labeled with the name of the seller and of the province. *Yunnan opium* is similar in appearance, but darker and not so hard. *Szechuen opium* was wrapped in ten folds of paper, as the opium is soft and black, but containing paper fibre—altogether 20 per cent. with the wrappings, and each cake weighs about 2 lbs. The analytical results show the absence of foreign substances. The alkaloids amounted to the following percentages, the results being calculated in 100 parts of dried opium :

	Kwei-chou.	Yunnan.	Szechuen.
Morphine .....	4.321	9.487	11.271
Narcotine .....	1.968	6.151	6.612
Papaverine .....	.848	.404	.334
Narceine .....	.692	.562	.769
Thebaine .....	.901	.817	.763
Codeine.....	.065	.157	.181
Morphine by B. P. method.....	3.83	8.94	9.86
Matter insoluble in cold water.....	51.62	40.50	44.19
Moisture .....	24.83	29.72	38.21
Ash.....	4.58	3.13	2.24

—Chem. and Drug., Dec. 14, 1895, 855.

*Indian Opium—Method of Manufacturing.*—John Jennings in a recent account of the manufacture and trade in Indian opium, describes the method of manufacture pursued in the Government works in Bengal. The opium is produced in the large tract of country which stretches for a length of about 600 miles and a width of about 200 miles through the region watered by the Ganges river. In that district opium is the chief crop. It is gathered by the cultivators in March, packed in earthenware jars and sent off down the Ganges to the government opium factories, where every jar received is carefully weighed and analyzed, and its value credited to the cultivator. The drug is then thrown into vats and kneaded into cakes for the market, an operation which is shown in an illustration accompanying the article from which this abstract is made. A second illustration shows the European employe—whose duty it is to classify the opium received from the cultivators—at his work, assisted by a native, who writes down the results of the examinations. The Indian Government pays as a rule about 5 shillings per lb. for this opium, and the crop is a fairly remunerative one, as an acre of land in Bengal yields from 20 to 30 lbs. per year on an average.—Chem. and Drugg., Jan. 25, 1896, 134-135.

*Indian Opium—Inquiry into the Cause of Low Morphine Percentage.*—Dr. George Watt, Reporter on Economic Products to the Government of India, has issued a circular to the opium agents throughout the opium-producing provinces, in which he solicits their co-operation in determining whether the low percentage of morphine in Indian opium is due to the Indian mode of preparation of the drug, or whether the juice of the poppy is deficient in alkaloid. He is inclined to think that a portion of the alkaloid is lost during the process of collecting and manufacturing the drug, and suggests that sufficient of the fresh juice should be collected in non-porous vessels and the juice dried at once by evaporation for comparison with a similar quantity of opium prepared by the native method, in which a portion of the juice is absorbed by the porous vessels employed for its

collection, while another portion is allowed to drain away.—Pharm. Jour., Sept. 7, 1895, 208-209.

*Artificial Opium—Preparation in India.*—According to Stephenson the native Indian doctors prepare an artificial opium as follows: 1 to 2 parts of genuine opium are rubbed to a paste with water and mixed alternately, in small portions at a time, with 8 parts of finely powdered aloes, 2 parts of stramonium seed, and 1 part of the root of *Canna indica*. The mass is formed into a cake, resembling those of opium, and is then buried in an earthen pot during 40 days. The product is said to resemble opium very closely both in taste and in appearance.—Pharm. Centralh., Oct. 10, 1895, 589.

*Opium—Microscopic Recognition of Source.*—Mjoën records experiments made with the view of establishing microscopic distinctions between the commercial sorts of opium, based upon certain differences in the method of their collection. Prof. Tschirch has already called attention to the fact that in Turkey opium, the most characteristic elements of distinction are the fragments of the fruit epidermis, which during the collection of opium in Asia Minor, are scratched off from the soft young capsules, and are invariably present in the opium and may be recognized under the microscope without difficulty, even in the powdered drug. The author has now examined Persian and Indian opium, in the collection of which it is customary to make a vertical instead of a horizontal cut into the capsule, in consequence of which the exudation collects in the form of a drop at the nether end of the cut, and is removed without scratching off any of the epidermis. He finds, as is surmised, that neither Indian nor Persian opium contains the characteristic epidermal fragments found in Turkey opium; and these are again distinguished from each other in that Persian opium invariably contains some added starch, which is never found in the Indian nor in Turkey opium. Chinese opium also corresponds to the Indian opium, in the absence of epidermal fragments and of starch.—Schweiz. Wochensh. f. Chem. Pharm., 1895, 469.

*Opium—Improved Method of Morphine Determination.*—G. Loeff has found that by the aid of sodium salicylate his method for determining morphine is very materially improved, the salicylate binding or dissolving the resinous constituents of opium that usually contaminate the morphine, and thus rendering the results more accurate. The improved method is as follows: Five Gm. finely powdered opium are carefully, and *without pressure*, triturated with 5 Gm. water, then diluted and washed into a flask with sufficient water to make a total weight of 44 Gm. The flask is closed and shaken during 15 minutes, 1 Gm. sodium salicylate is added, the mixture again shaken during several minutes, and filtered. To 25.8 Gm. of this filtrate, representing 3 Gm. opium, 3 Gm. ether and 1 Gm. ammonia water are added, and the mixture is vigorously shaken during 10 minutes. The morphine, now separated, is collected on a small filter, the

flask washed with 5 Gm. water, the washings being poured on the filter, and when this has completely drained, it is allowed to dry. After drying, the morphine on the filter is washed with benzol to remove any narcotine present, and then dried and weighed in the usual manner. The yield is about 12 per cent. less than when the official method of the Germ. Pharm. is employed, but the morphine obtained is in handsome white crystals, and is distinguished by its greater purity. In parallel experiments by this method the greatest variation noted was 14 per cent.—Pharm. Centralh., April 2, 1896, 209.

*Opium—Presence of Lead.*—R. Thal has determined in the ash of a sample of Smyrna opium, picked out of a lot of 700 lbs., a quantity of lead amounting to 0.4 per cent. of the opium dried at 60° C. The sample lost at that temperature 16.1 per cent. of moisture, and so dried yielded 12.19 per cent. of morphine. The total ash amounted to 5.02 per cent.—Chem. and Drugg., Jan. 25, 1896, 145; from Pharm. Zeit. f. Russl.

*Opium for Smoking—Analysis.*—Moissan has subjected three samples of smoking opium to analysis, with the results given below. The first sample was an Indian product, derived from the Patna factory. It had a somewhat syrupy consistence, and a delicate odor, and had been preserved for ten years. The second sample was made at Shanghai from opium produced from poppies grown at Wenchow. It was more fluid and had a less agreeable odor than the Patna brand. The third was a sample from Saigon, and of more recent manufacture.

	Water.	Extractive.	Morphine.	Acidity in terms of sulphuric acid.	Glucose.
Patna.....	27.2 p. c.	72.8 p. c.	8.97 p. c.	1.73 p. c.	.....
Shanghai .....	22.71	77.29	6.2	4.1	22.5 p. c.
Saigon.....	32.12	67.88	7.3	4.87	1.2

—Pharm. Jour., July 27, 1897, 75; from Journ. de Pharm. et de Chim. (6) II., 58.

*Sanguinaria—Assay and Standardization.*—Charles H. LaWall records a number of experiments made with the view to determine an assay process suitable for the standardization of sanguinaria. He finds that macerating 10 Gm. of the drug with 10 Gm. aqua ammoniæ and 100 Gm. petroleum benzin, separating the benzin solution, evaporating, and extracting the residual crude alkaloid with heavy chloroform ether (= 3 vols. chloroform and 1 vol. ether), the alkaloid is extracted in a pure condition, and represents the full percentage present in the drug. He has applied the process to the assay of a

*Fluid Extract of Sanguinaria*, made by the U. S. P. process, and obtained results which corresponded with the assay of the drug from which it was prepared. The author had tried other solvents—ether, Prollius' fluid, and light chloroform ether (= 1 vol. chloroform and 3 vols. ether) for the extraction of the crude alkaloid from the drug, but failed to obtain uniform results, such being readily obtained, however, by the use of petroleum benzin. His experience leads him to consider 1.50 per cent. as the average alkaloid content of the commercial drug by the benzin process.—Amer. Jour. Pharm., June, 1896, 305-309.

#### CRUCIFERÆ.

*Mustard—Constituents of the White and Black Seed.*—L. E. Sayre reviews the constituents of white and black mustard seeds, his conclusions being based principally upon the investigations of Will and Horner and of Will and Laubenheimer as contributed to Liebig's *Annalen*. The *fixed oil* is about the same in quantity in both seeds, the black seed containing 23 per cent., the white 22 per cent., and they are almost identical in composition. Both seeds contain considerable quantities of *albuminous matter*, and about 19 per cent. of *mucilage*. *Starch* is not found in either of these seeds, but the author appears to doubt the correctness of this statement. The ferment, *myrosin*, is present in both, the white seed generally containing more than the black seed, but in the latter is quite variable, sometimes as low as 2 per cent., and then again reaching as high as 18 per cent. Here the similarity in the constituents of two such seeds ends, except that they both contain a glucoside; but that contained in the white seed, *sinalbin*, is decomposed by the myrosin in the presence of water into glucose, sinapin sulphate, and a pungent fixed oil—*sulphocyanide of acrinyl* (ortho-hydroxy-benzyl sulphocyanide), while the glucoside of black mustard seed, *sinigrin*, yields glucose, potassium sulphate, and a pungent volatile oil—*allyl isosulphocyanide*.

The author has had both of these glucosides prepared in his laboratory by Edward F. Schopflin, who followed the processes of Will and Laubenheimer. A concise outline of these processes as carried out is given, together with the processes for isolating the ferment myrosin. The two glucosides crystallize from alcoholic solution in very similar small pearly needles. The author calls attention to the confusion existing in respect to the nomenclature of these two principles, the glucoside from white mustard seed having been known under no less than four different names, Sulphocyanide of Sinapine, Sulpho-sinapirine, Sinapin and Sinalbin, while Sinigrin is also known as potassium myronate. Attention is also called to a synthetic method for the preparation of the pungent principle of white mustard, suggested by E. C. Franklin; but this is so far speculative, and requires practical demonstration.—Amer. Jour. Pharm., July, 1895, 339-345.

*Mustard Seed—Comparative Description of the White and the Black*

*Seed*—E. F. Schopflin has contributed an interesting review of the character and constituents of white and black mustard seeds, in which he points out lucidly the diversity that exists in the constituents of the two seeds, on the one hand, and the great similarity that exists upon the other. To show more clearly these similarities and diversities, the author has tabulated the principal constituents of the two seeds, as ascertained to the present period, in parallel columns, as follows :

BLACK MUSTARD SEED.	WHITE MUSTARD SEED.
<i>Fixed oil 23 per cent.</i>	<i>Fixed oil, 22 per cent.</i>
Consisting of:	Consisting of:
Stearin,	Stearin,
Olein,	Olein,
Erucic Acid,	Erucic Acid,
Sinapolic Acid.	Sinapolic Acid,
Behenic Acid.	Behenic Acid.
<i>Myrosin, ? per cent.</i>	<i>Myrosin, ? per cent.</i>
	(A larger, percentage than in the black mustard seed.)
<i>Albumin, 30 per cent.</i>	<i>Albumin, 28 per cent.</i>
<i>Gums and Mucilage, 20 per cent.</i>	<i>Gums and Mucilage, 19 per cent.</i>
<i>Sinigrin (Potassium Myronate)</i>	<i>Sinalbin.</i>
<i>? per cent.</i>	Yielding:
Yielding:	Otho-hydroxy-benzyl sulpho
Allyl Isosulphocyanate,	cyanate,
Potassium acid-sulphate.	Sinapine sulphate.
Glucose.	Glucose.

Why these two plants of the same genus, being so similar in appearance and having so many conditions in common, should select different chemicals from which to build up their seed, and should then arrange them in forms so similar; what circumstances produce their conditions, what law governs their evolution, are questions which we scarcely dare even to hope to be able to answer.—Proceedings Kansas Pharm. Assoc., 1895, 66–67.

#### RESEDACEÆ.

*Reseda Odorata*—*Reputed Value of the Flower as a Taenicide*.—According to a Russian medical journal, a concentrated decoction of mignonette flowers is much esteemed in Russia as a taenicide. The administration (quantity not given), is followed by a large dose of castor oil, and the tape-worm is usually passed within three hours.—Amer. Drugg., April 25, 1896, 245.

*Reseda Luteola*.—Characters, etc., of its peculiar yellow coloring principle, *luteolin*, which see under “Organic Chemistry.”

#### VIOLACEÆ.

*Violet Perfume*—*Substitutes for the Natural Odor*.—Henry Kraemer communicates a lengthy paper in which he calls attention to the fact that

the violet perfume is rarely obtained pure, and that the commercial extracts generally consist of other perfumes, chiefly that of the *Iris* rhizome. He observes that while there are about 170 species of violets known, only two or three are sweet-scented, and those cultivated for their perfume are varieties of one species, *Viola odorata*, Linne. Owing to the delicacy of the plant, its cultivation, though very extensive, is quite precarious, and suffering of the harvest to the extent of 75 per cent. has been recorded. The cultivation of *Iris*, on the other hand, is not attended with any difficulties, and while formerly the rhizome of the wild plant was employed, the cultivated rhizome is said to be much more profitable, three species of *Iris* yielding the so-called "Orris Root." The author gives a brief account of the collection of the rhizomes, and the methods employed in extracting the perfume, but the greater portion of his paper gives in considerable detail the result of the studies of Fred. Tiemann and Paul Krüger from *Ber. d. Chem. Ges.*, xxvi., 3, p. 2675. Other plants having odors resembling the violet are the following, mentioned by Sawer in "Odographia": *a. Costus*, the root of *Aplotaxis lappa*, Decaisne; *b. the* root of *Carlina gummifera*, Lesson; *c. Myall wood*, the wood of *Acacia homalophylla*; *d. the* flowers of *Tritelia uniflora*; *e. the* flowers of *Dendrobium heterocarpum*; *f. the* flowers of *Oncidium inosmum*; *g. the* young green parts of *Geonoma pamila*; while many species of *Acacia* (*A. farnneriana*, Willd., *A. bertoloni*, *A. lophantha*, *A. dealbata*, *A. suaveolens*, *A. odoratissima*, Willd., *A. latronum*, Willd., and *A. lomatocarpa*, D. C.,) develop the odor of Cassie, which is considered an approach to the violet.—*Am. Jour. Phar.*, July, 1895, 346-356.

#### CACTACEÆ.

*Opuntia*—*Mode of Dissemination of the Members of the Genus*.—After speaking of the persistence with which the plants belonging to the genus *Opuntia* retain moisture, enabling them to remain green for months even when exposed to the dry and scorching heat of the plains, J. W. Tourney calls attention to its import upon the dissemination of these plants. The function of the spines in the *Cactaceæ* has been generally asserted to be largely for protection; but the author claims that the cylindrical *Opuntias* depend mainly for dissemination upon the readiness with which the branches break off, and upon the highly developed barbed spines. The flat *Opuntias* are nearly all smooth, but here the usual habit is prostrate or semi-prostrate, so that the branches bending or creeping take root at the joints. The young branches of the flat *Opuntias* are also more easily detached. This appears to be the prevailing method of dissemination, so much so that several species have almost lost the power of seed production, and even in species not sterile, owing to the unfavorable climate, the seeds seldom germinate.—*Amer. Jour. Pharm.*, Dec. 1895, 608-609; from *Botanical Gazz.*, Aug., 1895, 356.

*Opuntia Vulgaris*, Mill.—*Economic Uses of the Plant and Proximate Analysis of the Fruit*.—Bertha L. De Graffe has contributed a lengthy paper on *Opuntia vulgaris*, which is widely distributed in some portions of the Southern United States and southward, and is familiarly known, in common with other members of the genus *Opuntia*, as the "prickly pear," on account of the resemblance which its fruit bears to the ordinary pear. On account of its formidable spines and fleshy, unflammable nature, the plant is used for hedges, especially along the railroads, and it finds use to some extent also as a food for cattle, the only obstacle to its more extended use being the spines, which are, however, removed by the cowboys with their bowie-knives, or by throwing them into a fire, whereby the spines are scorched to such an extent that they drop from the plant. The fruit is a favorite food of the American Indians of the localities in which the plant abounds, great quantities being dried and stored by them for winter use. The ripe fruit has a pleasant acidulous taste, and is characterized by containing an abundance of red coloring matter, which, the author finds, can be extracted by maceration in alcohol, and which deserves further investigation because of a possible relation of the pigment to that of the cochineal; these insects, as is well known, feeding upon *Opuntia vulgaris*. A proximate examination of the fruit, desiccated so as to be reducible to powder, gave the following results: Loss on complete drying at 110°C., 10.08 per cent.; ash, 9.26 per cent.; containing potassium, calcium, and magnesium in form of chlorides, sulphates, phosphates and carbonates. Petroleum ether extracts 2.16 per cent. from the air dry substance, consisting of wax and caoutchouc; ether extracted 0.81 per cent. of a brown, resinous, slightly bitter substance, but this contained neither an alkaloidal nor glucosidal constituent. Absolute alcohol dissolved 10.64 per cent. of substances containing both glucose and saccharose; water dissolved 16.59 per cent. of organic solids, which contained besides saccharose and glucose an amount of mucilage and albuminous matter corresponding to 3.76 per cent. of the weight of the powdered fruit. Alkaline water dissolved an additional quantity of organic substance amounting to 5.02 per cent., of which a quantity amounting to 2.35 per cent. of the fruit was mucilaginous matter. Dilute hydrochloric acid removed 1.91 per cent. of organic solids. Tannin was not found.—*Amer. Journ. Pharm.*, April 1896, 169-177.

## CUCURBITACEÆ.

*Cucurbita Foetidissima*—*Proximate Examination of the Root*.—L. E. Sayre communicates the results of a proximate examination of the root of *Cucurbita foetidissima*, a plant which abounds on the plains of Western Kansas, where, on account of the globular shape and size of its numerous fruits, it is sometimes called "wild colocynth." The remarkable root is commonly known as "wild pumpkin," "man-in-the ground," and "Buffalo gourd." It is quite large, and is characterized by being hollow, the



inside of the cavity being covered with a healthy cortex. It can easily be reduced to a fine powder, in which form it has a very slight odor and a very bitter taste. To water it yields 12.96 per cent., to diluted alcohol 23.7 per cent., and to 94 per cent. alcohol 12.80 per cent. of its weight. Subjected to a systematic examination by William Lang, it yielded 0.93 per cent. of ash, containing phosphoric and carbonic acids, with iron, calcium, potassium and sodium, the first two bases being very prominent. The chloroformic extract amounted to 6.14 per cent. and was composed of volatile oil (1.28 per cent.), brownish yellow, very bitter, saponifiable fixed oil (1.93 per cent.), resin (1.50 per cent.), and waxy matter (1.43 per cent.). The alcoholic extract amounted to 13.20 per cent., and was composed of resin (3.16 per cent.), organic acid, etc. (2.91 per cent.), and extract showing the presence (?) of alkaloid (7.93 per cent.). The water extract amounted to 12.02 per cent., and was free from gum. The water and sulphuric acid extract amounted to 36 per cent., and was brown, bitter, acrid, and contained 14.21 per cent. of starch. The sodium hydrate extract amounted to 21.51 per cent., the cellulose, to 10.06 per cent., and the moisture to 8.70 per cent. Qualitative tests revealed the presence of a small quantity of alkaloid. The brownish yellow volatile oil was bitter to the taste, as was also the brown waxy matter.—Proceedings Kansas Pharm. Assoc., 1895, 44-46.

*Colocynth—Occurrence and Collection in Palestine.*—Consul Wallace, of Jerusalem, gives some information respecting the occurrence and collection of colocynth on the maritime plain that lies between Palestine and the eastern shore of the Mediterranean. The dwellers along this plain pay little attention to the plant, which grows without cultivation; and while some attention to the plant would result in the growth of larger and richer fruit, nature alone now supplies more than the natives can find a market for. The soil of the maritime plain is a light-brown loam, very rich, and almost without a stone. The plant thrives best in places where the loam has been mixed with sand, and notwithstanding the scarcity of rain, the plant does not suffer from this lack of moisture. The climate is warm all the year round, intensely so during the summer months, so that the conditions necessary for the successful raising of colocynth seem to be: a good soil somewhat sandy, a warm climate, and little moisture. The fruit is collected by the peasants in July and August, before it is ripe; it is sold to Jaffa dealers, who peel it and dry the pulp in the sun, then mould it into irregular balls, which are boxed, and shipped to England. This variety of colocynth is known as the "Turkish," and is superior to the Spanish and Morocco varieties in the amount of pulp it contains, which constitutes about 25 per cent. of the entire fruit.—Pharm. Jour., July 6, 1895, 8.

*Colocynth Pulp—Percentage of Ash.*—John Barclay considers the estimation of ash in powdered colocynth pulp to be useful in ascertaining its freedom from seeds. The latter are variously stated to contain from 2 to 4

per cent., the pulp from 8.6 to 14 per cent. of ash. As the mean of eight samples the author found the following percentage: Pulp, 11.45; seeds, 2.37; whole apple, 4.60.—*Amer. Drugg.*, March 10, 1896, 152; from *Proc. Midl. Chem. Assist. Assoc.*

*Pumpkins—Nature of Coloring Matter.*—H. Ritter Schroetter von Kristelli has investigated the nature and the distribution of the coloring matter in the pericarp of highly-colored varieties of the pumpkin, and finds that it is located to a small extent only in the palisade tissues, to a much larger extent in the underlying parenchymatous layers, and in both a crystalline and a non-crystalline form. The chemical reactions of the pure, isolated pigment show that it is a lipoxanthin, and identical with carotin.—*Pharm. Journ.*, Nov. 2, 1895, 366; from *Verhandl. Zool.-bot. Ges. Wien*, 1895, 298.

## PASSIFLORACEÆ.

*Passiflora Incarnata—Remedial Virtues.*—A writer in "Journal of Medicine and Science," after calling attention to the neglect into which the passion flower has fallen as a remedy, cites the favorable results which have been obtained with the plant by Dr. L. Phares and other writers, and gives his own experience with it. He has used it for years with success, using it in line with skullcap and cannabis indica in cases of tetanus or spasms. It is an excellent remedy to prescribe in those intractable cases of epilepsy and other convulsive conditions that perplex the physician. The one thing to complain of is an unaccountable nausea, retching and vomiting that occasionally follow its use—more nausea than vomiting—which seems to point to cerebral action rather than direct effect upon the stomach. He agrees with Dr. Phares upon the importance of reliable preparations. The latter gave it in the form of a dry extract made from the fresh juice. The present writer gives a green fluid extract (from the fresh plant only) in doses generally varying from 5 to 10 drops, repeated quite frequently, either alone, or in combination with other drugs.—*West. Drugg.*, Feb., 1896, 63.

## MYRTACEÆ.

*Myrtaceæ—Structure of Secretion Receptacles.*—Dr. G. Lutz gives the following general account of the structure of the secretion-receptacles of the *Myrtaceæ*, his observations having been made on about twenty species. They are never in the form of a canal, but are usually globular or ellipsoidal. They are generally formed at an early period from one or two epidermal cells, which are distinguished from the rest by their granular contents. The original cells divide, and the receptacle is formed schizogenously by the separation of the daughter-cells. The so-called "resinogenous layer" is formed on the walls of the secreting cells, in the form either of caps or of a continuous coating. It consists of a mucilaginous ground-substance, in which granules and rods are imbedded. The secreting cells

become obliterated at an early period. At a later period the walls of the receptacle become suberized. The secretion is developed in the "resinogenous layer," which disappears as the secretion is formed. When the receptacle is fully formed, the intercellular space becomes filled with the secretion, and the resinogenous layer disappears entirely, or nearly so. The receptacles vary greatly—between 20 and 230  $\mu$ —in diameter.—Pharm. Journ., March 28, 1896, 242; from Bot. Centralbl., 1895.

*Eucalyptus*—*Cultivation, etc., in the United States.*—Geo. M. Beringer, at a pharmaceutical meeting of the Philadelphia College of Pharmacy, gave a talk on the *Eucalyptus species*, referring more particularly to those grown in the United States. He states that 44 species are now grown at the California Forestry Station, at Santa Monica. Among these, *E. globulus* is perhaps the most valuable. It is easily acclimated, and has attained in this country a height of from 50 to 70 feet in a few years. It is utilized in California for planting around orange groves as wind-breakers, and appears to be so abundant that oil is distilled from it in this country. The oil yields about 75 per cent. of eucalyptol, and is the only kind that should be used medicinally. The author mentions other species, some of which may possibly be acclimated in higher latitudes.—Amer. Jour. Pharm., Nov., 1895, 592.

*Kino*—*Myrtaceous Varieties from Australia.*—See *Kino* under "Leguminosæ."

*Pimento*—*Distribution, Cultivation, Collection, etc.*—J. Ch. Sawyer says that the name "allspice" is given to the dried, unripe berries of *Eugenia pimenta*, D. C., by reason of their aroma and flavor, which are considered to resemble a mixture of cinnamon, cloves and nutmeg. The tree—a handsome evergreen attaining a height of from twenty to thirty feet, and occasionally exceeding forty feet—is indigenous to the West Indies, and is found on calcareous soil, thriving on rocky lands that are fit for little else, on the islands of Cuba, Trinidad, Hayti, Domingo, Antigua, all through the Leeward and Windward Islands, and more or less in all the islands of the Caribbean, but is most abundant in Jamaica, where magnificent native groves are found, which produce more than one-half of the allspice used in the United States. It is also found in Central America, Mexico, Venezuela and Costa Rica. Strictly speaking, the pimento tree is not really cultivated at all in Jamaica. The trees are found in greater or less numbers all over the island, growing wild and constituting in some sections the predominating trees; and the nearest approach to their cultivation in these localities is to clear away the underwood and to keep the groves clear from brushwood and creepers. When planted out, however, the trees begin to fructify in the third year and arrive at maturity in seven years, after which they yield abundantly.

The gathering of the berries must take place as soon as they have reached

their full size and while green, for when ripe the fruit—a succulent black or dark purple berry—is filled with a sweet pulp and has in a great measure lost the aromatic property which so strongly characterizes it during the unripe state. It is, therefore, a problem of some difficulty to the planters to secure the rapid gathering of the fruit when it has reached the proper condition, the more particularly since the gathering has to be done by hand and by the aid of ladders and climbing. The small twigs bearing the branches of berries are broken off and dried by exposure to the sun during the day—being frequently turned during the first two days—and protected against rain and dew by covering with cloth at night, the process of drying requiring about twelve days usually. Kiln-drying is resorted to by some planters, especially when the crop is abundant. The Jamaica crop is exported principally from Kingston in bags resembling coffee-sacks.

Allspice, the author observes, is sometimes adulterated with a Mexican spice called “Pimento de Tobasco,” which is a larger and less aromatic berry, produced by *Myrtus tobasco*, Mocino, a native of the hot regions in Mexico, and considered a variety of the true pimento tree. Another native West Indian tree, *Myrcia pimentoides*, D. C., yielding a fragrant berry, analogous to pimento, is now cultivated in the East Indies.—Pharm. Journal, April 18, 1896, 305–306.

#### CALYCANTHACEÆ.

*Calycanthus Glaucus*, Willd.—*Constituents of the Seeds*.—Supplementary to his former examination of the seeds of *Calycanthus glaucus* (see Proceedings 1888, 382), which resulted in the discovery of calycanthine (see also under “alkaloids”), Dr. R. G. Eccles communicates the results of a comprehensive examination of these seeds made since then, and describes in the present paper, besides a fixed oil, albumin, starch, resin and extractive substance, a number of new alkaloids which are associated with calycanthine and have not hitherto been described. With one exception these new alkaloids are represented in a mixture of crude alkaloids obtained by concentrating an alcoholic tincture of the seeds to a semi-solid consistence, extracting this with water, and adding to the aqueous solution caustic soda, potash, or ammonia. The dense precipitates, when collected on a filter and dried, constitute a bitter, light brown powder, which is wholly soluble in dilute acids, partly soluble in ether and in light petroleum ether, and almost insoluble in water. Upon treating these crude alkaloids repeatedly with petroleum ether, (b. p. 40° C., obtained by distilling commercial gasoline at this temperature with lard or other fixed oils), a crystalline alkaloid is obtained which the author names

*Glaucurine*, and which is associated in this solvent with an uncrystallizable alkaloid, having similar reactions, and from which the crystals may be freed by taking advantage of their slower solubility in petroleum ether after they have become well formed. For the amorphous alkaloid, the author proposes the name

*Sequatchine*, which he derives from the county (in North Carolina?) whence his supply of calycanthus first came. A third alkaloid, which owing to its liver-brown color the author has named

*Heparine*, remains as residue when the crude alkaloids have been completely extracted by petroleum ether. With hydrochloric acid it forms a very dark-brown crystalline salt, and the sulphate and nitrate are also brown in color. A fourth alkaloid is obtained from the calycanthus seeds after their extraction with alcohol by extracting them with water alone, or, to facilitate percolation, with a mixture of one part of alcohol and four parts of water. When this percolate is concentrated to a small bulk and rendered alkaline by caustic potash, this alkaloid, which the author names

*Calycanthoidine*, may be shaken out with ether, which yields it on evaporation in form of yellow crystals associated with much amorphous matter, probably also alkaloidal.

Three new decomposition bases and two acids have also been obtained, but these—and evidently also the new bases before mentioned—require further study and examination.—*Drugg. Circ.*, April, 1896, 77-78.

#### ROSACEÆ.

*Wild Cherry Bark—Variable Quality.*—J. B. Moore observes that when making the various preparations of wild cherry he has often been impressed with the varied appearance and difference in sensible properties which they presented when made with the usual care at various times from different lots of the drug. He attributes the evident variability in the quality of the bark, in some degree at least, to carelessness in its collection, but in a greater degree to a want of proper information as to the proper time for collection, the part of the plant and the age of the plant from which collections are made, and he suggests that a solution of the following questions would be worth the necessary experiments and investigation :

1. Is the bark of the trunk or that of the branches of the tree most active?
2. At about what age does the tree afford bark yielding the largest proportion of the principles concerned in producing hydrocyanic acid?
3. Does the bark containing the most coloring matter afford the strongest and best preparations?
4. Is it true that the bark of the root is the most active?
5. It is said that the bark deteriorates rapidly by keeping. What are the conditions under which it can be best preserved, and how long can it be kept in good condition?
6. Light and heat exerting a very pernicious influence upon the galenical preparation of the bark, should the drug not be dried at the common temperature and protected from light?—*Amer. Drug.*, Oct. 10, 1895, 215.

*Wild Cherry Bark.—Assay of Samples of Different Age.*—Alfred R. L. Dohme and Hermann Engelhardt have made some experiments to decide if the thin, green, virgin wild cherry bark is really, as is generally claimed, richer in hydrocyanic acid than the older, thick, brown bark. The results of these experiments, which are given in some detail, indicate that the thin, green bark is somewhat better than the brown, thick bark, as far as hydrocyanic acid is concerned. The young bark, in two different samples, assayed 0.216 and 0.183 per cent. of HCN, respectively, whilst the old bark, also in two samples, assayed 0.167 and 0.159 per cent. These results have additional interest in view of the recent experiments of Prof. A. B. Stevens, recently recorded in these Proceedings (1895, 226–229), who had found the older bark to contain the larger percentage, viz., 0.335 per cent. HCN, while the younger only assayed 0.250 per cent. The

*Method of Assay* finally adopted by the authors was as follows: Two grammes of the powdered bark are macerated for 12 hours with 150 Cc. of distilled water, and then distilled by passing live steam through the mixture for half an hour, the distillate being collected in a receiver containing a concentrated solution of potassium hydroxide, or into a solution of silver nitrate. In the first case, the amount of potassium cyanide formed in the distillate was titrated with decinormal solution of silver nitrate; in the second, the silver cyanide formed in the distillate was collected on a filter, and reduced to metallic silver in a porcelain crucible, the latter method giving somewhat higher but fairly concordant results. The authors convinced themselves that the distillate passing after passing live steam through the mixture of bark and water for half an hour, contained no hydrocyanic acid. In view of the results obtained, which are in conflict with those obtained by Prof. Stevens, the authors propose to continue their experiments with wild cherry bark from various sources, including samples from all investigators who have worked upon the subject.—Amer. Drugg., Oct. 25, 1895, 251.

*Wild Cherry Barks—Observations on the Bark of a Western Form of Prunus Virginiana*, Linne.—Edson S. Bastin has examined a specimen of bark from Marin county, California, the product of the shrub treated as a distinct species in Brewer and Watson's flora of California, under the name of

*Prunus demissa*, Walters, but regarded by Professor C. S. Sargent to be only a form—not even a distinct variety—of the choke cherry, *Prunus virginiana*.\* If Prof. Sargent's view is correct, the plant is very widely distributed throughout the North American continent, growing within the Arctic circle, as well as in Northern Mexico. The distinction between the plant growing in the East and those growing in the far west—California and Oregon—appears to be principally in that the Western shrub is

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\* Not to be confounded with the official "*Prunus Virginiana*," which is the bark of *Prunus serotina*, Ehrhardt.—Rep.

somewhat less diffuse and more tree-like in habit, though seldom attaining a height of more than 12 feet, while its leaves are pubescent underneath, instead of smooth, their texture rather more leathery, and the fruits usually less astringent than the Eastern form. Prof. Bastin finds the bark examined by him to be less bitter, but quite as aromatic as good specimens of the bark of *Prunus serotina*, excelling in the latter respect Eastern specimens of *Prunus virginiana* previously examined by him. No differences were observable, however, between the Eastern and Western barks, excepting such as are purely of an accidental character. Fracture and color of the interior surface correspond very closely. Nor does the microscopic study reveal any considerable difference between the Western and Eastern form—the slight differences, as well as those previously noted, are easily attributable to the widely different conditions of growth. The fact that the Western and Eastern forms are not to be regarded as distinct species, or even distinct varieties, does, therefore, not preclude that the former may be richer in medicinal constituents, as would be suggested by its more aromatic taste and odor. The author's paper is illustrated by cuts showing a cross-section of the bark, a longitudinal-tangential section of the inner bark, and of the starch from the inner bark of the Western plant known as *Prunus demissa*.—Amer. Journ. Pharm., Dec., 1895, 595-599.

#### LEGUMINOSÆ.

*Papilionaceæ*.—Enumeration of Plants of this Family in which the Presence or Absence of the Alkaloid Cytisine has been determined.—Dr. P. C. Plugge by his recent investigation has added several papilionaceous plants to the following list of those which have previously been determined to contain cytisine, viz.: *Cytisus Laburnum*, L.; *C. alpinus*, Mill.; *C. elongatus*, W. and K.; *C. sessifolius*, L.; *C. Weldinii*, L.; *C. hirsutus*, L.; *C. biflorus*, L.; *C. Alschingeri*, L.; *C. nigricans*, L.; *C. proliferus*, L. fil.; *C. Adami*, Poit.; *C. Ratisbonensis*  $\beta$  *minor*, Schæf.; *C. Ratisbonensis*, Schæf.; *C. polytrichus*, M. B.; *Genita racemosa*, Marnoch.; *G. ramosissima*, Ten.; *G. spicata*; *Ulex europæus*, L. (the ulexine of Gerrard). The plants now found by Dr. Plugge to contain cytisine are the following:

*Sophora speciosa* (the sophorine of wood),

*Sophora tomentosa*,

*Sophora secundiflora*, Lagasca,

*Baptisia tinctoria*, R. Br. (the baptitoxin of v. Schroeder),

*Baptisia australis*, and

*Euchresta Horsfieldii*, Benn.

The part of plant examined in each case was the seeds. The author has also examined the seeds of

*Sophora Japonica*,

*Sophora Japonica pendula*, and

*Sophora affinis*,

and found them to be devoid of cytisine. To these must be added the following plants in which other experimenters had determined the absence of this poisonous alkaloid: *Cytisus nigricans*; *C. sessilifolius*, L.; *C. argenteus*, L.; *C. capitatus*, Jacq.; *Genista tinctoria*, L.; *G. pilosa*, L.; *G. anglica*, L.; and *G. germanica*.—Arch. d. Pharm. 233 (1895, No. 6), 430-441.

*Sophora angustifolia*—*Presence of a Characteristic Alkaloid in the Root.*—See *Matrine*, under "Organic Chemistry."

*Acacia*—*Process of Gummosis in the Plants.*—L. Lutz has studied the process of gummosis in several of the species of *Acacia* which yield gum arabic. It commences in the cambium, the cell-walls of which display an acid in place of the previous alkaline reaction, and spreads from there in both directions, outwardly and inwardly. When the medullary rays have become completely impregnated with gum, certain spots near the pith exhibit a swelling of the cell-wall, and this marks the first exudation of the gum, which flows out into the cell-cavities of the fibres and of the xylem-vessels. From here it spreads to the parenchyma, which becomes transformed into a gummy mass. In the genera which yield other kinds of gum the processes are similar.—Pharm. Journ., Dec. 28, 1895, 536; from Bull. Soc. Bot. de France, 1895, 467.

*Gum Arabic*—*Test of Purity.*—A new process for proving the purity of gum arabic is described in "El Memorandum" as follows: To an aqueous 20 per cent. solution of the gum add a mixture composed of 15 drops of solution of ferric chloride, 15 drops saturated solution of potassium ferrocyanide, 15 drops hydrochloric acid, and 60 drops sulphuric acid. If the gum is pure, the coloration resulting appears a fine light yellow, and remains unaltered for eight or ten hours; but if the gum be adulterated with dextrin, the color passes during the first hour, or shortly afterward, to a blue, and from the intensity of this tint the degree of adulteration may be deduced.—Pharm. Jour., Oct. 12, 1895, 322.

*Senegal Gum*—*Source, Collection, etc.*—Some interesting information respecting the source and collection of senegal gum is given in "Natur" (xxxi. 370). The species of *Acacia* hitherto mentioned as yielding the gum are *A. Verek* and *A. Adansoni*. Two other species are now mentioned, *A. arabica* and *A. Seyal*. The gum is collected principally by the "Maures," a tribe of herders inhabiting the right bank of the Senegal. It was formerly supposed that the exudation was spontaneous, and produced when after the rainy season the dry season set in with east winds. While this may be true to a certain degree, it is now believed that the exudations of gum are mainly due to a parasite which infests the Acacias like the Mistletoe does European trees. It is called "Tobb" by the natives, and



has been identified by Charles Martin as *Loranthus Senegalensis*. At the point of penetration of this parasite into the bark, a swelling is caused, from which the gummy exudation flows, and is harvested by the natives by the aid of long sticks provided with a crook at the end. The first harvest begins in October and is ended during December. A second harvest begins in March, the crop being dependent upon and increased in proportion to the duration and strength of the east winds. The gum forests, called "Kraha," are owned by individuals of a tribe, and are jealously guarded against innovation by strangers.—Pharm. Centralh., Aug. 29, 1895, 490.

*Senna*—*Microscopic Characters of the Genuine Leaves and of its Adulterants*.—E. Latour has studied the anatomical structure of senna leaflets, and also that of the leaves and leaflets which are most frequently mixed with the drug, in the hope of being able to find some sure means of detecting these foreign admixtures. He observes that this is of especial importance in view of the possibility of the presence of the leaves of *Coriaria myrtifolia* or other dangerous species. The use of the microscope is the most valuable means available for this purpose, other methods of determination being frequently inapplicable. Thus, in cases where the principles contained in the drug have undergone considerable change, or the specimen consists of minute fragments, the anatomical elements are often found completely preserved. Omitting the numerous cuts (18), which must be inspected in the original paper, the following are in brief the results of the author's study :

*Leaflets of Senna (Cassia Sp.)*.—There is little difference between the upper and lower epidermis of senna leaflets. The cells are irregularly polygonal with thin walls, and there are numerous stomata, which are each in contact with two to four cells. There are also numerous unicellular hairs on the epidermis, which are deciduous, leaving as they detach themselves a base having the appearance of an annular pad, around which the neighboring cells seem to radiate. In *Cassia obovata* the stomata are situated on a level with the surface, and their outline appears simple under the microscope ; other sennas have the stomata placed below the surface, and with doubled outlines. The parenchyma, which is protected by an epidermis covered with a stout cuticle, is divided into three layers, the uppermost and the lowest consisting of palisade tissue, whilst between these there is a zone of very small, rounded, parenchymatous cells. Stellate crystals of calcium oxalate are seen here and there throughout the parenchyma, and prismatic crystals of similar composition occur singly in cells which unite to form sheaths around the principal veins. The epidermis is not colored by sodium hypochlorite. In the leaves of

*Coraria myrtifolia*, L., the cells of the lower epidermis are about a third larger than those of the upper epidermis. The cells are irregularly polygonal with thin walls, and the stomata are elliptical apertures, whilst each is ac-

accompanied by two cells placed symmetrically and finely wrinkled. Hairs are wanting. The leaf parenchyma consists in the middle of loosely-joined, rounded cells, and there are two rows of palisade cells adjoining the lower epidermis, but only one row adjoining the upper epidermis. The endodermis, which is clearly defined and consists of large cells, is colored yellowish-brown by sodium hypochlorite. In "argel" leaves,

*Solenostemma argel*, Hayne, the upper and lower epidermis are almost alike. The not very numerous stomata have very large apertures and are bordered by five to seven cells each. The hairs are numerous and multicellular. The leaf is characterized by its double zone of palisade cells, its very limited spongy parenchyma, and by the presence of sphæro-crystals and secretion cells. The median vein is large. In the leaves of

*Vaccinium vitis-idea*, L., the upper epidermis consists of polygonal cells with thick and sinuous walls, and is characterized by the lack of stomata, hairs and glands. The cells of the lower epidermis are smaller, and on this side of the leaf there are numerous small stomata, each surrounded by four or five cells, as well as multicellular glands. There are only two zones in the internal tissues of the leaf, one of palisade cells and the other of spongy parenchyma, and the edge of the leaf is traversed by a bundle of fibres. The fibro-vascular bundles in the veins are also covered by a mass of pericyclic fibres on their upper and lower surfaces. The leaves of

*Colutea arborescens*, L. have an upper epidermis consisting of irregularly polygonal cells which have thin and sinuous walls. Hairs are wanting and stomata very rare. On the lower surface, however, there are numerous small stomata with elliptical openings, each being surrounded by four or five cells. The long unicellular hairs are also abundant, and generally narrow at the base. The parenchyma presents no special features. The leaves of

*Globularia alypum*, L., have the epidermis alike on both sides, consisting of irregularly polygonal cells with very thick walls, and containing prismatic crystals of calcium oxalate. The numerous stomata are surrounded by two to five cells each, and have elongated apertures. The leaves bear bicapitate glands, but no hairs, and the parenchyma is homogeneous with but few interspaces. In the leaflets of

*Tephrosia apollinea*, De C., the epidermis is much alike on both sides, being formed of the usual irregularly polygonal cells, and the numerous stomata with large apertures are surrounded by several cells. The hairs are multicellular, long and numerous, and the parenchyma is normal. The median vein is triangular, projects at the base, and diminishes towards the opposite extremity. It is protected by a fibrous cover surrounded like the secondary veins by a sheath of cells containing crystals of calcium oxalate. Finally, the leaflets of

*Cassia marilandica*, L., are characterized by large, sinuous cells and the absence of stomata on the upper epidermis, whilst the lower epidermis

differs in possessing stomata with small, elliptical apertures. Hairs are lacking in both cases, the leaflet has but one row of palisade cells, and the spongy parenchyma is very loosely connected.

While the microscopic examination of specimens in a state of powder is an extremely delicate operation, the clearly defined characters of the principal substances used to adulterate senna readily enable the determination of the nature of any falsification.—Pharm. Journ., June 20, 1896, 481-484.

*Copaiba—Detection of Gurjun Balsam as Adulterant.*—Dodge and Olcott communicate a test for the presence of gurjun balsam in copaiba, which they are confident will prove uniformly reliable. It is as follows: If four drops of the suspected sample be dissolved in sufficient glacial acetic acid, say about half an ounce, and into this solution 4 to 6 drops of fresh C. P. nitric acid be introduced, the result, if the sample be pure copaiba, will be a clear and colorless, or but slightly cloudy solution. If, on the other hand, the sample be pure gurjun balsam, the resulting mixture will be of a deep purple color, resembling in this respect a solution of permanganate of potassium. An admixture of gurjun balsam with copaiba will show the purple color modified as to shade in the degree of their proportion, as small a proportion as 2 per cent. of gurjun balsam in the sample being thus revealed. The volatile oils giving the same reaction with the reagents mentioned, it is suggested that as a confirmatory measure the sample be distilled, and the test repeated upon the volatile oil, thus guarding against the possible interference of organic impurities, accidentally present. It is important that both reagents be of the official strength absolutely, and it is well to reject the first two or three drops of nitric acid out of a bottle, to insure exclusion of mixtures.—Am. Drug. and Phar. Rec., July 10, 1895, 5.

*Copaiba and Gurjun Balsam—Value of the Usual Tests of Distinction.*—Lyman F. Kebler, in view of the fact that the imports of copaiba have fallen below the annual consumption, while the imports of gurjun balsam have increased, has carefully gone over the tests of identity and purity of the two substances, and arrives at the following conclusions:

1. The color and the fluorescence or non-fluorescence are of no value.
2. The wide range of the specific gravity of copaiba makes that factor practically valueless.
3. The solubility or the insolubility of copaiba are uncertain factors and cannot be relied on.
4. The specific tests for turpentine, fixed oils and paraffin oils are reliable.
5. The ammonia tests are misleading.
6. The acid number cannot be relied on.
7. Hager's test for the presence of gurjun balsam in copaiba is not reliable when less than 23 per cent. of gurjun balsam is present.

8. The carbon disulphide test is fairly reliable with a moderately large per centage of gurjun balsam.

9. The glacial acetic acid (99.5 per cent.) test is perfectly reliable, even when not more than 5 per cent. of gurjun balsam is present.

10. The test of the U. S. P. dependent upon the gelatinizing of the sample of copaiba containing gurjun balsam upon heating it to  $130^{\circ}$  C. is not reliable. Some samples may gelatinize, but the samples examined by the author increased only slightly in viscosity, not even assuming a semi-gelatinous state. The author's results are exhibited in detail in a table accompanying his paper.—Am. Jour. Phar., Aug., 1897, 394-398.

Mr. Kebler's modification of the glacial acetic acid test for gurjun balsam, which consists in adding the gurjun balsam to the mixed acids instead of adding the nitric acid to the mixture of glacial acetic acid and gurjun balsam, has been criticised as being too delicate, and that by its application genuine copaiba may be held to contain gurjun balsam. Mr. Kebler has repeated his experiments with different specimens of pure copaiba, but in no case has he obtained reactions that could be mistaken for the reaction of gurjun balsam or of its admixture with copaiba.—Amer. Jour. Pharm., March, 1896, 143-144.

*Copaiba—Modified Test.*—The following test for the identity and quality of copaiba, which may be regarded as a modification of the test of the Germ. Pharm., is recommended by Ewell: To a mixture of 4 Cc. acetic ether and 2 drops concentrated sulphuric acid, 6 to 8 drops of copaiba are added; neither a red nor violet color should be produced within 15 minutes, and if then a small drop of water is added to the mixture and shaken, no red colored sediment should be deposited.—Pharm. Centralh., Aug. 15, 1895, 460; from Nord. Farm. Tijdskr.

*Balsam of Tolu—Observance of a Spurious Kind.*—J. Oldham Braithwaite calls attention to a spurious kind of balsam of tolu that has reached the London market via New York. It does not differ very materially from the genuine in appearance or consistence, though somewhat darker and more tenacious; but its odor is less fragrant and the taste decidedly weaker. The most marked characters of distinction are found in the carbon disulphide extraction, which is quite large, but dark resinous, somewhat viscid and free from crystals. Genuine tolu balsam yields to carbon disulphide a substance which on evaporation constitutes a mass of white or pinkish crystals. Upon determining the "saponification number" of the residues of a number of samples—genuine and spurious—some interesting figures were obtained which are given in a table, and which show that the spurious balsam residue requires a markedly less quantity of potash for its saponification than the crystalline residue obtained from the genuine. The author concludes that while the weight of the carbon disulphide residue varies considerably in genuine samples, the "saponification number" should not fall below 300, and he recommends (for the next edition of the B. P.), that

the following test be given:—When 5 parts (of the balsam) are gently warmed with two successive portions of 25 and 10 parts of carbon disulphide, and the solution decanted into a tared flask, the residue on distilling off the solvent should be distinctly crystalline, and each 1000 parts of this residue should require for saponification not less than 300 parts of potassium hydrate.—Pharm. Jour., Aug. 17, 1895, 145–146; from Proc. Br. Phar. Confer., 1894.

*Pterocarpus Draco*, Linne—*Characters and Percentage of Tannin in the Exudation known in Jamaica as "Dragon's Blood."*—Henry Trimble has subjected a sample of the exudation product of *Pterocarpus Draco*, Linne, known in Jamaica as dragon's blood, to proximate examination. His results prove it to be very distinct from the dragon's blood of the East Indies, and that it closely resembles the kinos, with which it should properly be classed. The sample was in small garnet-red pieces, transparent at the edges, and breaking with a resinous fracture. It was soluble to the extent of 95.95 per cent. in water, the insoluble portion consisting chiefly of adhering bark fibre, and its composition was as follows: Tannin, 34.85 per cent.; gum, 33.34 per cent.; moisture, 25.4 per cent.; ash, 2.36 per cent.; insoluble, 4.05 per cent. The tannin, which was separated from the gum with great difficulty, was found to be closely related to oak-bark tannin, both in its reactions and in its ultimate composition.—Am. Jour. Phar., Oct., 1895, 516–517.

*African Kino—Reappearance in the London Market.*—The "Chemist and Druggist" (Feb. 8, 1896, 226–227) calls attention to a recent importation of African kino, a fairly large consignment having been received, which, with the exception of containing a little more woody matter and being a little lighter in color, corresponds well with a recently-received sample, accompanied by specimens of the leaves, fruit, and bark, and examined by Mr. E. M. Holmes. This kind of kino is evidently yielded by

*Pterocarpus crinceus*, Poir. (formerly called *P. echinatus*), the leaves of which are distinguished by an acute apex, while the leaves of *P. marsupium* have an emarginate apex, while the fruit and bark of the two species appear to agree perfectly. The tree yielding kino is the African rosewood, known to the natives as "kano," whence the present name of the drug is derived. It is noteworthy that whereas the African kino, which disappeared from the European market in the early part of this century (about 1811), came from the west coast, from the Gulf of Guinea down to Angola, the parcel now received comes from East Central Africa, where the tree, so far as could be ascertained, was hitherto unknown.

In a second paper (Ibid., March 28, 1896, 460–461) attention is drawn to the varieties of kino found in the London market, and a comparison made with the recently received African article. The British Pharmacopœia, in common with other Pharmacopœias, says very little about the

drug, except that it is derived from *Pterocarpus marsupium*, Roxb., and it gives certain characters, which do not exclude "kinos" of different origin. That there is room for more precise information will be evident from the results of examination of samples drawn from parcels offered at public sale in London during a period of two months preceding the date of this paper, given as follows :

Appearance.	Ash.	Soluble in Water.	Soluble in Alcohol.	Tannin Value by Löwenthal's Method.
1. Black, grinds to red brown.	4 per cent. gray.	For the most part. Solution dark red.	Less than half.	34.4 per cent.
2. Violet-black.	2.8 per cent. white.	Almost complete. Pale red solution.	Three-fourths.	39 per cent.
3. Garnet-red leaves adhering to corky bark.	6 per cent. gray.	For the most part. Port wine colored solution.	Gelatinizes.	28 per cent.
4. Black — grinds red.	3.4 per cent. white.	Almost complete. Dark port wine colored solution.	.....	26.2 per cent.
5. Intense black, grinds brown.	7 per cent. gray.	Less than half. Port wine colored solution.	.....	14.2 per cent.
6. Garnet-red.	1.75 per cent. white.	About three-fourths. Pale red solution.	Almost completely.	52 per cent.

The tannin was determined (as gallo-tannic acid) by Löwenthal's method, a concise description of which accompanies the paper quoted. The origin of Nos. 1 and 2 could not be traced ; No. 3 came from Bombay, and was apparently a natural product, but not kino. The origin of No. 4 is also obscure, the original box being simply marked "by land carriage." No. 5 was imported from India, and included only so as to give a complete review of the kinos offered. No. 6 is from the most recent consignment of African kino. It comes in small bags, six of them aggregating about 46 lbs., and it is a curious fact that it was shipped as "Kano," the native name from which "kino" is derived. There seems to be no reasonable doubt that this article is destined ere long to become one of regular supply. All that can, so far, be learned respecting its source is that it is collected in "out-of-the-way districts" of the Zambesi region.

*Kino—New Constituents in Australian Myrtaceous Varieties.\**—In in-

\* Referred to under "Myrtaceæ," but conveniently considered together with official kino. Rep.

vestigations on the exudation of the Australian Myrtaceæ during the last few years, the substances known as kinos have been divided into three classes: the ruby, gummy and turbid groups. The members of the first are soluble both in water and in alcohol, of the second practically insoluble in alcohol, while those of the third deposit from their hot aqueous solutions bodies which render the solution turbid. J. H. Maiden and Henry G. Smith have made some comprehensive investigation of this last named, the turbid group of kinos, and have determined the substances that cause the turbidity not to be elagic acid, as has been suggested, but to be due to two new organic substances,

*Eudesmin* and *Aromadendrin*, the latter name being used provisionally, the authors confining their present experiments, however, to the kino from *Eucalyptus hemiphloia*, F. v. M., and to the closely resembling kino from *Angophora lanceolata*, Cao., as being typical specimens of the turbid group.

*Eudesmin* can easily be obtained crystallized and in a pure state by the authors. By slow evaporation of its alcoholic solution it is obtained in rhombic crystals, but larger crystals from amyl alcohol under like conditions. It is odorless, almost tasteless, though very slightly sweetish; soluble in hot water, crystallizing from it on cooling; soluble in ether, acetic ether and chloroform; insoluble in benzol, petroleum spirit, disulphide of carbon. It is dissolved by glacial acetic acid, and again deposited on dilution with water; dissolves with a beautiful yellow color in strong nitric acid, and with a dark color, changing to purple on standing, in conc. sulphuric acid. Deposits occur, due to products of change, in both cases. It is neutral, and has a composition leading to the empirical formula  $C_{26}H_{30}O_8$ . The second body, provisionally called

*Aromadendrin*, is extracted from the kino with eudesmin by ether. It is a resinous-looking substance, but may under suitable treatment be obtained in six-sided plates, which polarize most beautifully in bright colors. It is crystallizable from water, and easily soluble in ether.—Am. Jour. Pharm., Nov., 1895, 578–581; from Proc. Roy. Soc., N. S. W., 1895.

*Ground Nuts—Composition and Production of Oil.*—A. M. Villon gives some information concerning the production of ground-nut oil, which is known in commerce chiefly by the name of "Pondicherry oil." The first thing done with the fruits is to remove the shells and pericarps, which is effected by machinery. The shells constitute 22 per cent. of the weight of the fruit, the pericarp 7 per cent., and the cotyledons the rest. The composition of the respective parts is represented by the following figures:

	Skinned nut.	Unskinned nut.	Shell.
Proteids .....	18.45	19.95	6.53
Nitrogen .....	2.95	3.19	1.05
Fatty matter .....	26.45	34.45	—
Ash .....	3.57	1.87	9.24
Water .....	32.11	34.10	25.42
Phosphoric acid .....	0.329	0.384	0.150
Potash .....	0.370	0.350	0.412

The actual yields of oil are 30 to 32 per cent. from the raw nuts, and 40 to 42 per cent. from the peeled nut. There are three qualities of oil: "superfine," the product of the first pressure in the cold; "fine," of the second pressure; and "huile de fabrique," the third pressure, with the aid of heat. The residue makes a good cattle food.—Chem. and Drugg., Jan., 1896, 145; from Rev. de Chim. Industr.

*Spartium Scoparium*.—*Unsatisfactory Quality of the Flowers*.—The flowers of *Spartium Scoparium*, L.—Flores Genistæ—are in recent years of unsatisfactory quality both as to appearance and odor, as produced in German-grown broom. In consequence, the handsome flowers of *Spartium junceum*, which are derived from Southern France, and possess a characteristic honey-like odor, have for a number of years been preferred in the German market.—Pharm. Centralh., Sept. 12, 1895; from Pharm. Centralh., Sept., 1895.

*Colutea Arborescens*.—*Isolation of an Acid*.—Barbey has isolated from the leaves of *Colutea arborescens*, which have a purgative action similar to senna leaves, a crystalline acid, which he names

*Coluteic Acid*.—It crystallizes from alcoholic solution in form of fine needles and from hot watery solution in form of fine lamellæ; melts at 155°, and is soluble, also, in chloroform and in carbon disulphide. In some of its reactions it resembles phenol; in others, cinnamic acid.—Pharm. Centralh., Jan. 23, 1896, 45; from Union. pharm., 1895, 389.

*Eschynomene Aspera*.—*Characteristics of the Wood-Substance Contained in the Pith-Like Stems*.—See "Lignocelluloses" under "Organic Chemistry."

*Soja Bean*.—*Production of Root-Tubercles*.—Professor O. Kirchner has observed that while the roots of *Soja hispida* produce tubercles abundantly in their native country, Japan, none are found when the plant grows in European botanic gardens. In order to ascertain the causes of this difference, the European plants were grown in soil obtained from Japan. The result was the production of abundance of root-tubercles, showing that the tubercles must be caused by a microbe present in the soil. He regards this as



a special microbe, for which he proposes the name *Rhizobacterium japonicum*. In their anatomical structure, the root-tubercles of *Soja* agree most closely with those of *Phaseolus*.—Pharm. Journ., March, 1896, 242 : from Cohn's Beitr. z. Biol. d. Pfl., 1895.

*Soja Bean—Value as Food, etc.*—Henry Trimble reviews the recent literature on the Soja bean (*Soja hispida* Moench,) which constitutes an important article of food in India, China and Japan. Being rich in proteids, it supplies the deficiency in the rice which forms the principal food of the populace, particularly in China and Japan, the following analysis, collected from different authorities, indicating sufficiently the reason for the popularity of the Soja bean in countries where nitrogenous food is in demand :

	1	2	3	4	5
Crude protein .....	38.69	31.21	34.92	33.36	42.05
Fat .....	17.87	18.29	15.33	21.89	20.46
Crude fibrin .....	12.69	12.78	12.81	—	4.53
Starch .....	3.49	3.51	3.53	—	—
Ash .....	5.39	5.63	5.97	5.35	4.19
Other organic matters .....	21.01	28.09	26.53	34.18	28.82

The soja bean contains also an active diastatic enzyme, which is said to have a powerful action upon starch. It is said to be present to a greater extent than in any other leguminous seeds, and that it converts two-thirds of starch into sugar and one-third into dextrin. The fat, which melts at 27° to 29° and solidifies again at 8° to 15°, is digestible to the extent of 89.8 per cent. The starch, which was found to be present by Pellet and Guissmann to the amount of the small percentage given under 1, 2 and 3, has recently been proved to be absent, on which account soja meal has been suggested to be used in making bread for diabetics. The drawbacks to the soja bean are its indigestibility, and, when dry, slow yielding to the cooking process. In order to overcome these difficulties, there have been prepared in Japan since the remote times when the soja bean was first used, at least three products, *miso*, *natto* and *tofu*, in the manufacture of which the aim is to produce an easily digestible and nutritive food.

*Miso* is made by subjecting the steamed beans to the action of koji, a diastatic ferment prepared from rice or barley.

*Natto* is prepared by boiling the beans in water for four or five hours until they are perfectly soft, then exposing them for twenty-four hours, wrapped in straw, in a well-closed cellar, in the middle of which a fire is kindled. The heat induces a considerable bacterial growth during this short period, and gives the product—which is regarded as a vegetable cheese—a peculiar but not putrid odor.

*Tofu*, which is essentially a vegetable casein, is produced by soaking the beans for twelve hours, then pulping them, boiling the pulp with water, filtering through a cloth, and allowing the white, opaque fluid, which resem-

bles cow's milk, to stand until it sours—the process being accelerated by adding a portion of sour liquid from a previous preparation. Coagulation occurs, the coagulum being collected on a cloth, pressed, and cut into tabular pieces of about 150 Gm. each. These, when, dipped in a mixture of turmeric and brine, are ready for use.—Amer. Jour. Pharm., June, 1896, 309–313.

## TEREBINTHACEÆ.

*Rhus*—*Poisoning by Various Species*—Geo. M. Beringer has collected the recent observations of several writers on “*Rhus* poisoning,” whose papers appeared in various numbers of “*Garden and Forest*” (September and October, 1895), and gives his own experience with the poison, to the influence of which he is very susceptible. I. W. Harshberger considers

*Rhus toxicodendron* as poisonous in all seasons of the year, stating that poisonous effects have been experienced in January. He believes its action, however, to be most severe in August and September. These observations coincide with the personal experience of Mr. Beringer, who was first attacked in April, 1883; then, having been very careful in the interim not to expose himself to the influence of the poison, he was again attacked in May, 1894, having disturbed some roots and vines of the plant accidentally while taking up some violets; and in September of the same year, the effects were again experienced after passing some plants in fruit. In November he came across an upright variety of the plant with fruit well developed and leaves fallen, when his face and hands were again poisoned. D. P. Penhallen observes that the poisonous principle is more or less common to the entire family, and states that he was subjected to all the effects of *rhus* poisoning by opening an old “marking nut,”

*Semecarpus Anacardium*, these effects being due to the black varnish-like latex in the interior of the nut. He also reports serious poisoning results from stirring and smelling the Japan lacquer made from

*Rhus Vernicifera*, and states that after a few experiences it was always possible to ascertain whenever he came into an atmosphere charged with the poison. This was manifested by a well defined acid taste in the mouth and a slight, somewhat acute pain directly between the eyes; these were invariably symptoms of the results to follow. Prof. C. S. Sargent considers that

*Rhus Michauxii*, a rare shrub of North Carolina and Georgia, is the most poisonous of the North American species of *Rhus*. E. G. Ledeman writes of his personal experience, and speaks of the appearance of boils after each attack as a painful concomitant of poisoning by *R. toxicodendron*. Mr. Beringer also speaks of a series of boils as adding to the discomforts of *rhus* poisoning in his experiences. During the past summer he has adopted washing hands and face with a solution of hydrogen dioxide as a preventive, with apparently good results, and he prefers as a topical

application in the treatment of the disease, a lotion composed of: granular sodium sulphite, 1 drachm; glycerin,  $\frac{1}{2}$  fluid ounce; camphor water, q. s. ad fac. 4 fluid ounces.—Amer. Journ. Pharm., Jan. 1896, 18–20.

*Rhus Toxicodendron*—*Substitution by Virginia Creeper*.—According to J. L. D. Morison the leaves of the common Virginia creeper, *Ampelopsis quinquefolia*, Mich., are sometimes substituted for those of the official *Rhus toxicodendron*. A quantity of the drug which was recently purchased from one of the most reliable wholesale drug houses, was found to be so substituted. The fraud may be easily detected by soaking a sample of the leaves in water, when examination will easily reveal the distinction between the two leaves; those of the poison ivy being pinnately compound with three leaflets, while those of the Virginia creeper are palmately compound with five leaflets. Moreover, the individual leaflets of the two plants differ in form; the terminal leaflet of the poison ivy being long-petiolate, ovate or oval in general outline, with an acuminate apex, a somewhat wedge-shaped base, and a nearly entire margin, while the lateral leaflets are nearly sessile, obliquely ovate, pointed, unequal at the base, with a variously notched or toothed margin, and have short petioles of nearly equal length. The general botanical distinctions of the two plants are so marked that, unless fraud is intended, the substitution of the harmless leaves of the Virginia creeper for those of the active poison ivy can only be explained on the ground of ignorance or great carelessness of the collector.—Amer. Jour. Pharm., Mar., 1896, 131–132.

*Sumach—Commercial Varieties*.—It is stated in "Kew Bulletin" (Nov., 1895, 293), that there are three sorts of sumach known in commerce, viz., Venetian, North American, and Mediterranean. The last named is the one most widely used, and consists of the powdered leaves only of

*Rhus coriaria*, a hardy shrub growing on the rocky slopes of Sicily and elsewhere. 25,000 tons of it were exported from Palermo in 1894, of which 5,500 tons were taken by America. The Venetian sumach, or young fustic, consists of the twigs of

*Rhus cotinus*, and is used in calico printing, producing a bright yellow dye. The North American sumach is stated to be yielded by

*Rhus glabra*, the fruit, leaves and bark being used together for their astringent properties in tanning leather; but Mr. Geo. M. Beringer (in a foot note) observes that the "Kew Bulletin" is evidently misinformed about North American sumach, which, while partly obtained from *Rhus glabra*, is mainly gathered from

*Rhus copallina*, chiefly because this species yields a larger percentage of tannin than any other sumach in America.

Absolutely pure sumach should contain 20 to 22 per cent. of tannin as gallo-tannic acid, but a satisfactory quality, and one of greater strength than generally sold, would be 20 per cent.—Amer. Jour. Pharm., April, 1896, 214–215.

*Séribéle*.—*A New Tænistuge*.—Heckel and Schlagdenhauffen describe a new tænistuge from French Guinea, which is called by the natives "séribéle," meaning "red medicine." The medicine consists of the red seeds and the root-bark of

*Connarus Africanus*, Lam., of which an illustration accompanies the original paper. The seeds are about one inch long and one-third of an inch in diameter, and resemble a kidney-bean in shape; for about one-third of their length they are enveloped in a red fleshy arillus. The authors have made a chemical examination of the seeds and of the root-bark, but have not detected any special active principles. The seeds contain about 5 per cent. of iron-blueing tannin, a neutral fat, an orange coloring matter—apparently composed of a rose-colored and a yellow substance—adhering very persistently to a fat, and crystalline fatty acids, consisting of three parts stearic to one of palmitic acid. The constituents of the root-bark are similar, but the crystalline fatty acids are not present.

In Conakry and the greater part of French Guinea, the seeds are employed; but in Bramaya the root bark is used. The seeds have been used with success: by Dr. Maclaud in four cases, by Dr. Drevon in three cases out of five, the former giving a decoction of 60 grammes, while the latter gave 25 grammes infused for twelve hours in water, the entire substance being given in both cases.—Pharm. Journ., Mar. 28, 1896, 243; from *Annales de la Faculté des Sciences de Marseille*.

*"Pepper" Tree*.—*Value as a Shade and Ornamental Tree*.—Attention is drawn in "Garden and Forest" (Dec. 18, 1895, 502), to the extensive use of the "pepper" tree,

*Schinus molle*, as a shade and ornamental tree in all the region south of the Bay of San Francisco, and its particular adaptability as a street tree for dry arid regions. Much of the beauty of the streets and gardens of Southern California is due to the presence of this South American and Mexican tree, which, introduced by the Spanish Mission priests, is frequently regarded by travelers as a native and typical California tree. In wet weather the leaves emit a pungent balsamic odor, due to resin glands with which they abound, and which burst on contact with moisture. The berries are used in Chili to prepare an agreeably flavored but very heating wine, and the bark yields a dye of the color of burned coffee.—Amer. Jour. Pharm., April 1896, 215.

#### PIPERACEÆ.

*Ground Pepper*.—*Micro-Chemical Recognition of Olive Kernels, Almond- and Nutshells as Adulterants*.—Martelli employs phloroglucin, recommended by Wiesner for the microchemical determination of lignin, to determine the presence of olive kernels, almond- and nut shells, and other lignin substances in ground black pepper. About 1 Gm. phloroglucin is digested during one or two days in 50 to 60 Cc. of hydrochloric acid, sp.

gr. 1.1. With this turbid reagent, 0.5 Gm. of the pepper is moistened in a porcelain vessel and carefully heated until hydrochloric acid vapors are manifested. Substances containing lignin assume under these conditions a decided cherry-red color, easily recognized with the naked eye, while the pepper particles assume a yellow to red-brown color. If the substance is washed by decantation, a red-violet powder remains, which is composed almost completely of foreign admixtures.—Pharm. Centralh., Dec. 5, 1895, 701.

*Kava Kava—Preparation of the Intoxicating Beverage on the Tonga Islands.*—Rodney H. True has contributed an interesting review of the history and uses of kava-kava in various islands of the Pacific Ocean and the South Sea, and gives a description of the method of preparing the intoxicating beverage, used under certain religious ceremonies by the natives of these islands, condensed from Mariner's History of the Tonga Islands. The paper is accompanied by several photogravures showing the preparation of the beverage, the utensils used, etc., and, by way of comparison, a reproduced cut showing the preparation as given in "Captain Cook's Three Famous Voyages Around the World." The author also reviews the modern experiments and therapeutic uses to which the drug has been applied in the civilized world. Referring to Dr. Lewin's researches, which have determined the anæsthetic effect of the drug to be due to a resinous principle, the author observes that this is apparently contradictory to the well known fact that the intoxicating beverage of the natives is essentially a cold infusion of the ground root. Experiments made with some of this drug in the laboratory of the University of Wisconsin, showed that the alcoholic solution of the resin contained also some potassium chloride; and the author considers it not improbable that this stands in some peculiar relation to the resin, rendering it possibly emulsifiable in aqueous media, a question which must be determined by experiments to be made.—Pharm. Review, Febr. 1896, 28–32.

#### RHAMNACEÆ.

*Cascara Bark—Localization of the Active Principles.*—E. Cabanes has confirmed the results of Borscow with regard to the localization of frangulin in buckthorn bark (*Rhamnus frangula*). He examined sections of the bark as they were being acted upon by alcoholic potash solution, and observed a reddish color at once develop in the bast and cortical parenchyma, being especially marked in the medullary rays. On treating sections of cascara bark (*Rhamnus purshiana*) in the same manner a different result was apparent, the coloration affecting only the five or six layers of bast adjoining the cambium, then spreading through the medullary rays and developing in one or two layers of the cortical parenchyma. Red granulations were observed in the bast cells, which were unaffected by acetic, nitric, hydrochloric, and sulphuric acids. Ammonia and soda were

found to produce the same reddish coloration as potash. The conclusions drawn from the experiments is that the active principles of cascara bark—in so far as these are represented by cascarin, rhamnetin, frangulin, rhamnotoxin, and chrysophanic acid—are concentrated in the layers of bast immediately adjoining the cambium, and in the medullary rays traversing these layers.—Pharm. Journ., May 2, 1896, 343; from Rép. de Pharm. (3) vii, 97.

## CELASTRINEÆ.

*Celastrus Scandens*.—*Study of the Coloring Matter of the Aril of the Seed*.—Ida A. Keller has made a microscopical and chemical examination of the aril of the seed of *Celastrus scandens*, with the view to determining the nature and character of its red coloring matter, which appears to be one of the exceptional red coloring matters that is not affected by alcohol. The author found this pigment to be soluble in carbon disulphide, forming a deep-red solution, in which no precipitation was visible on the addition of alcohol. On evaporation, an amorphous, sticky mass resulted, which distinguishes it from carotin, with which it has some characters in common. Water had no visible effect upon it; alcohol, 50 per cent., became slightly yellow tinged, and absolute alcohol acquired a deeper tinge; ether and acetone exerted solvent action similar to 50 per cent. alcohol, chloroform produced a deep-red solution, as did also carbon disulphide. Concentrated sulphuric acid changed the pigment first to a greenish color and then to a decidedly blue. With iodine solution in potassium iodide a blue-green color is developed, like the color characteristic to the cyanophyceæ. Boiling with potassium hydroxide shows the coloring matter of *Celastrus scandens* to be remarkably resistant to the action of alkalies, since it remains unaffected.

These experiments and results show that whilst there exists some resemblance between the color reactions of sulphuric acid and of iodine upon carotin and the red pigment under consideration, the color reactions of xanthin—a yellow pigment—resemble those produced with the *celastrus scandens* pigment more closely. On the other hand in its solubilities, as well as in color, the latter resembles carotin more closely, and the author concludes that in it we find a connecting link between the crystallizing carotin of red flowers and fruits and the amorphous resin-like xanthin of yellow flowers. These observations, furthermore, tend towards confirming Courchet's views, that the pigments of yellow and red chromatophores, having the property of turning blue or green with sulphuric acid, thus distinguished from all other pigments, represent a group of closely related compounds, whose composition demands further investigation.—Amer. Journ. Pharm., April 1896, 183-186; from Proc. Bot. Sec. Acad. Nat.-Sc., Phila.

## EUPHORBIACEÆ.

*Castor Oil—Methods of Production in India.*—The "Chemist and Druggist" (Aug. 31, 1895, 358), gives some interesting details respecting the cultivation of the castor oil plant in India, the preparation of the oil, its uses, etc., from which the following may find place here. Two chief forms of *Ricinus communis* are met with in India, but under each of these there are numerous modifications in color and shape of leaves and presence or absence of spinous appendages on the fruit. The one form is a tall bush, or almost tree, a perennial, produces a larger seed and yields an inferior oil; while the other is an annual, cultivated as a regular crop, produces smaller seeds, and yields, by an expensive and careful process, the superior qualities of the oil of pharmacy and commerce; the yield of the first named plants being largely used in India for illuminating and lubricating purposes. In the Madras Presidency three different methods for extracting the oil are in use. In the first, the seeds are roasted in a pot, pounded in a mortar, and placed in four times their volume of water, which is kept boiling under frequent stirring. After a while the pot is removed from the fire, the oil is skimmed off, and the residue is boiled again the next day, the oil produced by the second boiling being considered the best. In the second process the seed is boiled, dried in the sun, pounded, and then subjected to the same process of boiling with water, etc., as is the first process. The third process consists in soaking the seed in water for a night, grinding it next morning in the ordinary native oil-mill, and straining through a piece of cloth, the product being used for lighting and dyeing purposes. At the Government farm at Saidapet experiments were made for the purpose of ascertaining the relative merits of its various methods of expressing castor oil. The quantity of beans operated upon in each case was 100 lbs., and the results are given in the table below. In experiment No. 1, the oil was cold drawn, the seed being crushed in a screw press with horizontal rollers, the resulting pulp put in gunnies, and pressed. In No. 2, which was divided into *A* and *B*, extraction was effected by the ordinary native process of roasting, boiling the result in water, and skimming off the oil as it rose. The difference between *A* and *B* was chiefly caused by the over-washing of the beans in *A*. In experiment No. 3, the ordinary native mill was employed, and the oil, after the pulp had been well pressed, was boiled.

Description . . . . .	No. 1.	No. 2.		No. 3.
		<i>A</i>	<i>B</i>	
Oil . . . . .	36.5 per cent.	27 per cent.	32 per cent.	30.43 per cent.
Cake . . . . .	36.8 per cent.	—	—	43.48 per cent.
Husks and waste .	26.7 per cent.	—	—	26.09 per cent.

The oil obtained by process No. 1 is stated to have been very pure, but

in the others was dirty. The yield, also, was considerably larger, as will be observed, the native estimate of yield being about 25 per cent. of quantity of beans used.

*Castor Beans—Experimental Cultivation in Georgia.*—D. F. Davenport contributes some interesting observations concerning the cultivation of the castor-oil bean in South Georgia. On account of cold and the imperfect knowledge of the culture of the plant, the experiments superintended by him have resulted rather disastrously ; but there are many reasons to believe that South Georgia, and especially Sumter county, is admirably adapted to the cultivation of the "bean." The plant assumes enormous size and yields abundantly in this soil and climate ; while the quality of the beans grown in Sumter county, as qualified by one of the largest "crushers," is the finest he ever saw. With the view to encouraging further experiment by Georgia farmers, Mr. Davenport gives information concerning the preparation of the soil, the planting of the seed, the method of cultivating the plants, the harvesting of the crop, the precautions to be observed during the curing of the crop, the yield, price, etc. Castor beans weigh 46 pounds to the bushel, and are graded according to quality : *Prime beans* being bright and uninjured beans, and weighing when cleaned not less than 41 pounds to the measured bushel ; *No. 2 Beans* are also bright and uninjured by rain, but weigh not less than 38 pounds per bushel ; *Rejected Beans* are the latter slightly injured by rain ; while *No-grade Beans* are such as are badly damaged by rain or frost, or weigh less than 38 pounds per bushel.—Proceedings Georgia Pharm. Assoc., 1895, 45-51.

*Croton Oil—Nature of the Vesicating Constituent.*—W. R. Dunstan and Miss L. E. Boole communicate the results of an inquiry into the nature of the vesicating constituent of croton oil. According to the latest researches—by Kobert and Hirscheydt—the vesicating constituent is obtainable as a viscid oil, which is saponifiable, and has been named "croton-oleic acid" because of its close relationship to oleic acid. The authors, starting with this croton-oleic acid, subjected its lead salt to fractional precipitation by adding successive quantities of water to its alcoholic solution, and thus eventually determined the croton-oleic acid to be composed for the most part of inactive oily acids, the lead salts of which are precipitated first, whilst the true vesicating constituent is contained in the last fractions, and represents only a small proportion of the original material. This final fraction was found to possess extraordinary power as a vesicant, and being resinous in its character, the authors propose to name it

*Croton resin*, to the presence of which the vesicating property of croton oil is doubtless due. Its composition is represented by the empirical formula  $C_{18}H_{18}O_4$ , but its constitution is evidently complicated and its molecular formula probably represented by multiples of this. It is a hard, pale yellow, brittle resin, nearly insoluble in water, light petroleum, and



benzene, but readily dissolved by alcohol, ether, and chloroform. It is fluid at 90° C., is neither acid nor basic, and therefore not saponifiable. Its vesicating power is destroyed by prolonged boiling with aqueous potash or soda, and it is decomposed into several acids, some belonging to the acetic series.—Pharm. Jour., July 16, 1895, 5.

*Queensland Cherry—Medicinal Value.*—Attention is drawn, in "Kew Bulletin," to the fruit of *Antidesma dallachyanum*, Baill., which is known (in Australia?) as the Queensland cherry, and also as the Herbert River cherry. According to Bailey the fruit, which is about the size of a large cherry, has a sharp acid flavor, resembling that of the red currant, and, like the latter, makes an equally good jelly, so that it may properly be placed among medicinal plants, on account of its juice being grateful to the parched palates of persons suffering from fever.—Amer. Jour. Pharm., Dec., 1895, 623.

*Cocus (or Kokra) Wood—Irritant Properties of the Sawdust.*—The recent experience of a workman who, engaged in sawing cocus wood, was on several occasions attacked with a painful dermatitis of the face, has induced Wm. Elborne to subject this wood to chemical examination. Cocus or kokra wood is yielded by a species of

*Aporosa*, Bl., a genus which is represented by about twenty species, all trees, and natives of tropical Asia and Oceania. The wood is used chiefly for making musical instruments, and, as seen in a transverse section of a log, the central heart-wood, which is very hard, closely grained, and of a dark-brown color, is sharply limited by the white sapwood. About 20 tons a month come into London. A species which grows in the forests of Burmah is said to yield a red resin and a bark which is used as a red dye. The heartwood of the sample that caused the irritation in the case mentioned yielded on analysis:

	Per cent.
Moisture.....	10.0
Substance soluble in petroleum ether ..	0.0
Soluble in ether—a red resin.....	8.6
Soluble in alcohol—tannin and coloring matter .....	6.1
Soluble in water.....	7.2
Insoluble fibre .....	68.1

—Chem. and Drugg., Jan. 18, 1896, 85-86.

#### URTICACEÆ.

*Indian Hemp—Examination of the Resin: "Charas."*—T. B. Wood, W. T. N. Stivey and T. H. Easterfield have examined "charas," the exuded resin of *Cannabis Indica*, with the view to the isolation of the active principle. The method consisted in the fractional distillation of the ethereal extract prepared from the crude substance. Besides a terpene (b. p. 170°-180°), a sesquiterpene (b. p. 258°-259°), identical with that

obtained previously by Valenta from Personne's "Cannabene"—the green oil obtained when the hemp plant is distilled with water—and a paraffin—probably  $C_{20}H_{40}$ , m. p. 63.5–64—the authors obtained a

*Red Oil*, present in the sample of "charas" examined, to the amount of 33 per cent., and doubtless the active constituent of the plant. It has the composition indicated by the formula  $C_{18}H_{34}O_2$ , is semi solid below  $60^\circ$ , and boils constantly at  $265^\circ$  at 20 Mm. pressure. In doses of 0.05 Gm. it produces intoxication, followed by sleep. The substance has also been isolated by the authors from a number of pharmaceutal preparations made from the plant, and it is present in the resin as prepared by T. and H. Smith in 1847 to the extent of 80 per cent.—Chem. News, May 1, 1896, 207.

*Cannabis Indica—Characters of Essential Oil.*—Vignolo states that the essential oil of Cannabis Indica, when purified by distillation in a current of steam and extraction with ether, is a mobile liquid boiling at  $248^\circ$  to  $268^\circ$ . By repeated distillation from metallic sodium, to remove a stearopten, he obtained from this oil a sesquiterpene,  $C_{18}H_{34}$ , which is a mobile, colorless oil, has an aromatic odor, boils at  $256^\circ$ , has the sp. gr. 0.897 at  $15.3^\circ$ , and is slightly laevo-rotatory. The oil soon resinifies on exposure to air, and on adding concentrated sulphuric acid to its chloroform solution, the liquid becomes first green, then blue, and finally red on heating.

The author concludes that the "cannabene" obtained by Personne from this oil was a mixture.—Pharm. Jour., Nov. 30, 1895, 454; from Gazette Chim. Ital.

*Cannabis Indica—Chemical Investigations.*—F. Marinozucco and G. Vignolo have made some investigations to determine definitely what are the active principles of Indian hemp. On exhausting the crude drug by boiling it with water acidulated with sulphuric acid, they obtained an alkaloidal substance which, when converted into hydrochloride, formed a colorless, deliquescent, crystalline mass, the yield being about four or five grammes from fifty kilos of the drug. The physiological action of this salt showed it to be a powerful cardiac depressant, much more active than the product from *Cannabis sativa*.—Gaz. Chim. Ital., 1895, 262–268.

The "Pharm. Journal" (Dec. 21, 1895, 519) commenting on these results, observes that the authors have succeeded only in adding to the difficulties which already beset the subject. Polli has pointed out that vegetable acids destroy or invalidate the physiological action of *Cannabis Indica*, and it cannot, therefore, be expected that still stronger acids would extract the active principle or principles unchanged.

*Figs—Description of Extra-floral Nectaries.*—A. Mirabella describes the nectaries found on the leaves of several species of *Ficus*. They agree with each other in their anatomical characters, in their origin, which is always from the modification of epidermal cells, and in the nature of their contents. In addition to saccharine substances, which serve largely to

attract insects, they contain proteid substances, but no starch. The glands or nectaries make their appearance as small areolæ with well-defined outlines, somewhat depressed, and sometimes covered with a white scurf. Their usual position is the under side of the leaf in the axil of a primary vein, but they also occur on the branches at the base of a leaf-stalk.—Pharm. Jour., May 30, 1896, 424; from Giorn. Botanico Italiano, 1895, 340.

*Elm Bark.*—*Insect Infesting the Adulterated Powder.*—W. B. Day has noticed four specimens of powdered elm bark that are infested by a reddish-brown beetle, which he recognized to be the confused flour beetle,

*Tribolium confusum*, Dur.—This beetle is described in a recent publication of the U. S. Department of Agriculture as being a dangerous enemy to flour, meal and other farinaceous products. The infested samples of powdered Elm bark were all proved to be adulterated with flour.—The Graduate, Sept., 1895, 13.

*Elm Bark.*—*Adulteration with Wheat Starch.*—Lyman F. Kebler communicates the results of an examination of six commercial samples of powdered Elm bark, two of which revealed the presence of wheat starch by the microscope, which was further indicated by the low percentages of ash (3.10 and 3.65 per cent.), and the dark blue reaction produced by Lloyd's modification of the U. S. P. iodine test (see Proceedings 1895, —), as applied by him to Elm bark. The other four samples gave a more or less faint or greenish-blue reaction, showing the presence of starch not revealable by the microscope, but nevertheless a natural constituent of Elm bark, as pointed out by Professor Lloyd. Their ash residues varied between 7.14 and 7.88 per cent.—Amer. Jour. Pharm., April, 1896, 195–196.

#### BETULINÆ.

*White Birch Bark.*—*Use for Fumigating Pastilles.*—It is stated in "Pharm. Journal" (June 6, 1896, 446), that a patent has recently been taken for the manufacture of a fumigating pastille, having the scent of white birch bark. It is mixed with pumice or fire clay and nitrate of potash, and shaped into pastilles or cones for burning.

#### CUPULIFERÆ.

*Horsechestnut.*—*Internal Use as a Cure for Hæmorrhoids.*—Dr. Astult recommends a concentrated tincture of horsechestnut (strength not given) as an unfailing cure for hæmorrhoids, in doses of 10 drops daily. In most cases a marked improvement was observed after two such doses, and after few days the painful symptoms had entirely disappeared.—Amer. Drug., May 10, 1896, 275; from Rev. de Therap.

*Beechnuts.*—*Percentage of Oil, etc.*—Charles H. LaWall, after reviewing the literature upon the beechnut and the oil obtained from it, its uses, etc.,

communicates the results of his own experiments made to determine the constituents of the seeds and the characters of the expressed oil. The beechnuts examined by him were gathered in Sullivan county, Pennsylvania. The weight of 100 average nuts was 28.60 Gm., while that of 100 selected nuts was 33.15 Gm., the percentage of husks in the latter being 36.52, leaving 63.48 per cent. of kernel. The moisture was 6.01 per cent., ash 3.27 per cent., albuminoids 25.13 per cent., starch 3.5 per cent., sugar none, fixed oil 30.65 per cent. The oil, having been extracted by ether, possessed characters which differed from the European oil obtained by expression, its sp. gr. being 0.985, its acid number 23.43 and its saponification number 229.52. The author therefore prepared some oil by expression and thus obtained a normal sample of oil, which corresponded very closely with the European oil. It was of a pale yellow color, mild, nutty taste, and has a neutral reaction. The sp. gr. was 0.9216 at 15° C.; the saponification number was 195.02.—*Amer. Jour. Pharm.*, Jan., 1896, 11-18.

*Galls—Mode of Development.*—In considering the formation of galls in general, Küstenmacher states that vegetable tissues become developed, which enclose the animal embryos or fungus spores, or the existing tissues become utilized for the same purpose. A nutritive layer is then developed from the tissues, from the inner epidermis of which roundish sacs or long papillose hairs are in turn developed, or the cells may possess pores through which the nutritive materials can pass and become utilized by the larva. The results of experiments disprove the idea that vegetable galls might be produced artificially, and that either the puncture or the irritation it causes to the plant indicates the development of the gall. In every case the factor which produces the gall is the larva of an insect or a fungus spore, and the development of the gall can at any time be checked by killing the larva or spore.—*Pharm. Journ.*, Dec. 28, 1895, 536; from *Bot. Gaz.*, xx. 497.

*Galls—Production in Flowers.*—Molliard gives a very detailed account in "*Annales des Scien. Natur. Botanique* (new series I. 67) of the galls produced in flowers by the action of parasitic fungi, belonging to the *Peronosporæ*, *Uredinæ*, and *Ustilaginæ*, especially in reference to the anatomical disturbances produced in the host plant. When the same parasite attacks allied species, the results will often be different in the different species. In the vegetative organs of the flower (calyx and corolla), either the nature itself or the distribution of the tissues will be altered. In the sexual organs sterility is not an uncommon result, both in the pollen sacs and in the ovules. The modifications produced by parasitic fungi in a large number of different flowers are described at length.—*Pharm. Journ.*, May 30, 1896, 423.

## CONIFERÆ.

*Conifera*—*Review and Original Investigations Respecting the North American Species*.—Edson S. Bastin and Henry Trimble have contributed the first of a series of articles on the botany, histology, chemistry and economics of the most important North American species of the Conifera. They consider that no large family of plants in this country has received so little attention at the hands of the microscopist and chemist as this one, and they hope, by studying one or more typical species in each genus and publishing the result, to be able materially to add to the knowledge of the whole order. In the present paper the authors give in concise review the general characters, classification and distribution of the plants belonging to this order, as well as a brief account of their chemical composition and their economical uses. The first species considered by the authors is

*Pinus Strobus*, L. (White Pine, Weymouth Pine). After a botanical description of the plant, a description of the microscopical structure of the stems of various ages, of the roots showing two or three rings of growth, and of the leaves, is given, illustrated by cuts showing the structure of the stem, base and leaves in cross-section, of the xylem of the stem in cross-section and in longitudinal-radial section, and of the starch from the root of the plant. They found tannin—of the variety that gives a green precipitate with ferric solution—to pervade all parts of the stem; the xylem tissues containing but a small proportion of tannin, however, as compared with the tissues exterior to the cambium zone. Similar results were obtained from the study of sections of the root, and while the xylem tissues of the root contained more tannin than the xylem tissues of the stem, they contain, as in the stem, little as compared with the bark. In the leaves the tannin occurs in large quantity in many of the mesophyll cells, in smaller quantity in most of the other cells of the same tissue, and apparently not at all in a few of them. In the endodermis and pericycle tissue little or none was observed, but in the phloem and other soft tissues within the pericycle it occurred in abundance in the protoplasm. The *proximate examination of the leaves* resulted in the production of 18.83 per cent. of sour-tasting extract by their exhaustion with absolute alcohol. Water removed from this alcoholic extract a quantity equal to 8.74 per cent. of the leaves, and contained the tannin of the leaves, while petroleum ether dissolved from the remainder of the alcoholic extract wax, chlorophyll and fatty matter, leaving a gritty substance undissolved. The residue of the leaves, remaining after extraction by absolute alcohol, yielded to distilled water 5.56 per cent. of extract, containing mucilage and glucose. The *bark of the stem* yielded to absolute alcohol chlorophyll and other substances, amounting to 29.25 per cent. of its weight, and this extract, which had an acid reaction, in its turn, yielded to water an amount of substance equal to 8.65 per cent. of the bark. The acid aqueous solution so obtained gave a dark green color and precipitate with ferric

chloride, a heavy yellow precipitate with bromine water, and was little changed by calcium hydrate, even on standing. Petroleum ether, applied to the alcoholic extract, as in the case of that of the leaves, left a brown residue, consisting of resinous matter and the before-mentioned substance having a gritty character. The *tannin* was estimated by the hide powder method in the leaves and in the barks of the stem and root, the result being given as follows :

	Moisture.	Ash in Absolutely Dry Material.	Tannin in Moist Condition.	Tannin in Absolutely Dry Material.
	Per cent.	Per cent.	Per cent.	Per cent.
Leaves .....	15.21	2.94	2.18	2.57
Stem bark .....	9.10	2.31	8.50	9.35
Root bark .....	11.16	4.67	5.76	6.48

The constituents of the ash of the bark appear to be identical with those of the leaves. The authors also communicate the results of the proximate examination of the leaves and stem bark of

*Pinus Excelsa*, Wall. The leaves yielded to absolute alcohol 16.23 per cent. of their weight of dry extract (having a strong acid reaction), and this yielded to water an amount of extract equal to 5.99 per cent. of the weight of the leaves employed, having an acid reaction, and containing an iron-greening tannin. The gritty principle remaining upon treatment of the alcoholic extract with petroleum ether was here also observed. Water extracted from the residue of the leaves, after treatment with alcohol, a little mucilage, and decided quantities of glucose. The treatment of the stem bark gave essentially the same results as those obtained with that of *Pinus strobus*. The amount of alcoholic extract was 25.04 per cent., and from this water extracted a quantity of substance corresponding to 6.42 per cent. of the bark. Water removed from the residual bark much mucilaginous matter, just as in the case of *P. strobus*. Determination of moisture, of ash (which showed the same composition as that of *P. strobus*), and of tannin, gave the following figures :

	Moisture.	Ash in Absolutely Dry Material.	Tannin in Moist Condition.	Tannin in Absolutely Dry Material.
Leaves .....	17.85	2.80	2.93	3.56
Stem bark .....	7.99	2.18	7.69	8.36
Root bark .....	8.99	3.03	6.08	6.68

In a second paper, after giving the general character of the "Pinaster group" the authors give those of

*Pinus Rigida*, Miller, (Pitch Pine), a native to the eastern part of the American continent, ranging from New Brunswick south to Georgia and westward to eastern Kentucky and Ohio. The microscopic structure of the leaf in cross section, of part of the stem (twig) in cross section, and of starch from the root, is given in illustration and description. The leaves were not examined chemically, because they possess no apparent economic value. In the stem bark, the most abundant constituent is the oleo-resin. It contains 9.00 per cent. of moisture, and the absolutely dry bark yields 1.03 per cent. of ash and 16.07 per cent. of tannin, giving a green color and precipitate with ferric chloride, a yellow precipitate with bromine-water, and a purplish precipitate with lime water.

The tree is valued chiefly for its oleo-resin, which is so abundant as to interfere with its usefulness as lumber, but making it highly valuable for fuel.

*Pinus Austriaca*, Höss (Austrian or Black Pine), is regarded as a variety of the Corsican pine (*Pinus Laricio*, Poirét), of Southern Europe, and is cultivated in this country as an ornamental tree. The microscopic structure of the leaf and a twig in cross section, and of the starch from the root, are described and shown in cuts. No investigation of the oleo-resin has been made, the tree serving for this purpose being a small one taken from a nursery near Philadelphia, but it is known to be an important constituent of the tree. Mucilage was present in moderate proportion, and the following table shows the percentage results obtained in estimating the tannin, moisture and ash in the several parts of the tree :

	Moisture.	Ash in Absolutely Dry State.	Tannin in Air-Dry State.	Tannin in Absolutely Dry State.
Leaves .....	6.70	3.05	3.56	3.86
Trunk bark .....	7.25	2.17	13.58	14.64
Root bark .....	5.96	2.73	11.12	11.82

*Pinus Palustris*, Miller (Long-leaved Pine, Southern Yellow Pine), is distributed through all the South Atlantic and Gulf States, at some distance from the coast, and covering a belt, interrupted only here and there, about 125 miles in width. In the present installment of their paper, the authors give a description, accompanied by cuts, of the microscopic structure of the leaf and of the one-year old stem, in cross-section, and of a portion of the cortex.—Amer. Jour. Pharm., Febr., 1896, 65-79.

Two specimens of *Pinus palustris* were secured for the chemical exam-

ination, one from North Carolina, the other from Dr. Charles Mohr, of Mobile, Alabama, the first consisting of the leaves and stem of a young tree, the other of the trunk bark of an old tree, both collected in December. The following are the percentage results for moisture, ash and tannin :

	Moisture.	Ash in Absolutely Dry Material.	Tannin in Air Dry Material.	Tannin in Absolutely Dry Material.
Leaves of young tree .....	4.92	1.91	7.54	7.93
Stem bark of young tree ....	7.46	1.34	17.49	18.89
Trunk bark of old tree .....	10.62	0.80	5.04	5.64

The tannin gave a green color and precipitate with ferric chloride, and reactions with bromine water and with lime water similar to those observed in the tannin from the other species heretofore considered. The leaves yield a green color and communicate an acid reaction to absolute alcohol, and both the leaves and bark contain mucilage, though in relatively small proportions. The oleo-resin has not been investigated, though such an investigation is, in the opinion of the authors, sadly needed, and they give a short review of the investigations in this direction that have heretofore been made. In this connection, also, the authors communicated the results of a chemical examination of the bark of the nearly related

*Pinus Longifolia*, Roxb., which they have secured through the courtesy of Mr. A. E. Wild, Conservator of Forests, Bengal, India. This handsome tree, the Cheer or Chir pine, has a branchless trunk for fifty feet, the whole tree attaining a maximum height of 100 feet, with a stem-girth of 12 feet, and yielding a turpentine which is much prized by the natives of Afghanistan and the Northwest Himalays, where it is indigenous. The sample of bark examined yielded 11.85 per cent. of moisture, 2.33 per cent. of ash, and 14.62 per cent. of tannin, which in its qualitative reactions indicated identity with the tannin from oak bark, and on combustion yielded 62.5 per cent. of carbon and 5.28 per cent of hydrogen.—Ibid., March 1896, 136–140.

*Pinus Echinata*, Miller (*Pinus Mitis*, Michaux), short-leaf pine or yellow pine, is found occasionally as far north as Massachusetts, but is more common farther south, from New Jersey to South Carolina and Florida, and along the Gulf States westward as far as Texas. The microscopic structure of the leaf and stem is shown in cuts and described. The moisture, ash and tannin were determined in two specimens of the bark, one the corky bark of a full-grown tree from Alabama, the other, the bark of a younger tree from New Jersey, both collected in December. The results are given as follows :



	Specimens from	
	Alabama. per cent.	New Jersey. per cent.
Moisture .....	9.17	8.22
Ash in absolutely dry bark.....	1.32	1.52
Tannin in absolutely dry bark.....	18.19	11.26

The per centage of tannin in the Alabama specimen is considered too high, owing to coloring matter unavoidably retained by the hide powder and recorded as tannin. The resinous products of the short-leaf pine are by far the most important constituents, and it figures therefore to some extent in the turpentine industry, as many as 3,000 boxes having been cut in one county of North Carolina alone during 1893. The young trees are the only ones which yield sufficiently to justify boxing, but they yield only two-thirds as much turpentine as the long-leaf pine.

*Pinus Taeda*, Linne.—Loblolly pine, old field pine, frankincense pine, whose habitat extends from Florida to Southern New Jersey, and westward as far as Texas and Arkansas, is most abundant in the coast region, and affects both wet clay and dry sandy soils. An illustrated description of the microscopic structure of the leaf and stem bark is given. A specimen of the bark collected near Atlanta, Ga., in October gave the following :

	Per cent.
Moisture.....	9.55
Ash in absolutely dry bark.....	1.19
Tannin in absolutely dry bark.....	12.55

The kind and distribution of tannin agrees closely with that in the other species. This species of pine is, however, richer than most of the others in oleo-resinous matter, and the loblolly pine is therefore considerably tapped for turpentine, although not as profitably as the long-leaf pine.

*Pinus Cubensis*, Griesbach.—Cuban pine, slash pine, bastard pine, swamp pine, occurs from South Carolina to the Florida Keys, and westward to Louisiana, but does not occur far from the coast. It is one of the three species that yield the great bulk of the turpentine of the South, but the amount obtained from the Cuban pine is below that obtained from the loblolly, and far below that from the long-leaf pine. The microscopic structure of the stem shows intimate relation between this and the two previously-mentioned species. The amount of tannin in the bark is, however, quite insignificant, the following being the results obtained with a specimen of bark received from Dr. Mohr, of Alabama, and collected during the month of December :

	Per cent.
Moisture.....	9.04
Ash in absolutely dry bark.....	0.72
Tannin in absolutely dry bark.....	1.36

The oleo-resins of this and the loblolly pine are more fluid than that of the long-leaf pine and consequently yield a larger proportion of spirit of turpentine.—Ibid., April, 1896, 199-210.

The May installment of this very interesting contribution to the knowledge of some North American Coniferæ is devoted by the authors to a description of

*The Turpentine Industry*, the products of which are known in commercial circles as *naval stores*, and which has been carried on in Southern United States for about two centuries. While a considerable quantity of "naval stores" is yielded by *Pinus taeda*, *P. echinata*, and *P. Cubensis*, the long-leaf pine, *P. palustris*, yields not only the largest proportion of these products in the United States, but it furnishes the great bulk of the supply for the whole world, which amounts in value to over ten million dollars annually, one-tenth of which falls to the share of France and Austria, the only other producers of naval stores. At one time the pitch pine, *Pinus rigida*, of the north Atlantic States, yielded an abundance of naval stores, though exclusively for home consumption. But this source has long been exhausted, and it may therefore be well not to lose sight of a possible exhaustion, however remote, of the supply of naval stores from the still abundant *P. palustris*. For the conditions under which this industry is carried on are extremely extravagant and wasteful, and there seems to be little disposition on the part of those engaged in the industry to adopt the more economical methods practiced in European countries. What this waste means may be gathered from the following resumé respecting the yield of a 200 acre turpentine "orchard," quoted by the authors from a recent report of B. E. Fernow, Chief of United States Forestry Department :

"If we assume that 4,500 trees produce these amounts (given in a table, Rep.) in four years, the yield per tree in crude turpentine is about 60 pounds. The result at the still would indicate that each tree furnishes between  $1\frac{1}{4}$  and  $1\frac{1}{2}$  gallons of spirit, and  $\frac{1}{8}$  of a barrel, or 30 pounds, of rosin of better grade, or at best 75 cents' worth of product during the four years, which it has cost 55 cents to produce, leaving 5 cents net per tree per year, or from \$1 to \$1.25 per acre." "From the fact that 4,000 acres of timber land (20 crops of 200 acres each) during four years working produce 120,000 gallons of spirit of turpentine, or  $7\frac{1}{2}$  gallons per acre per year, it follows that to produce the 17,000,000 gallons reported as the annual product, not less than 2,250,000 acres must be in orchard ; and since the yield of the first year represents 35 per cent. of the total annual yield, at least 800,000 acres of virgin forest are newly invaded annually to supply the turpentine stills in operation."

The authors, drawing their information from trustworthy sources, give a concise description of the various operations involved in the turpentine industry, illustrated by handsome cuts showing the methods of "boxing,"

"cornering," etc., together with the implements required in these operations. It is to these methods that the real waste is due. From two to four of these boxes are cut into the tree, according to its size; the cuts being about 14 inches wide, penetrate about 4 inches toward the center of the tree, and are about 7 inches in depth; above these boxes the surface of the tree is chipped from time to time to promote the flow of oleo-resin, until a height of 5 or 6 feet is reached, the turpentine flowing into the boxes and being collected by dippers from time to time, the number of "dippings" during the first season being about seven. Under this treatment the product is rendered impure by chips, sand, etc., and there is much loss of oil by evaporation, while the tree itself even succumbs and is destroyed. In the French system, on the other hand, the chipping is more slowly and carefully conducted, the chipped surface being only 3 to 5 inches wide, instead of 13 to 14 inches as with us; and the product is not collected in "boxes" cut into the tree, but by means of a lip or trough is collected in a detachable cup, in which the loss by evaporation is reduced to a minimum, and the introduction of chips, bark, and other foreign matter may be completely prevented. Such a process, or one similar, has been suggested by J. C. Schuler, and it is calculated to result in a saving of product that more than compensates for the extra investment for the iron or earthenware cups; but, what is of greater importance, it prevents the destruction of the trees. Mr. Schuler's method of cutting the trees for the reception of the oleo-resin in the cups is shown in a cut accompanying the present paper of the authors. Some remarks are also made by them on the production of tar, which, however, do not develop any points that are not familiar.—Ibid., May, 1896, 242-254.

*Pinus Resinosa*—Aiton.—The authors describe the microscopic structure of the leaves and stems of this handsome tree, known as the "Red" or "Norway Pine," and show in illustration cross sections of the leaf and of the two-year-old stem, this examination being made upon a specimen grown near Philadelphia, and collected in November. The tree is straight, attains a height of 75 to 150 feet, and has a northerly range, growing in the Northern United States from Maine to Minnesota, and in Canada. It has a compact, hard wood, which is very durable, and much prized for lumber. It is capable of yielding an abundance of resin, which would make it valuable for that constituent in the absence of other resinous pines. The percentage of tannin also would indicate that the bark might be put to good use in tanning. The chemical examination gave the following results:

	Moisture.	Ash in Absolutely Dry Substance.	Tannin in Absolutely Dry Substance.
Leaves.....	7.71	2.28	.260
Stem bark.....	9.73	2.65	12.67
Root bark.....	10.77	2.67	8.40

*Pinus Glabra*, Walter, the "Spruce Pine," branches from near the ground, and attains a height of only 40 to 60 feet. It occurs in South Carolina and Florida, the specimen examined by the authors having been collected near Appalachicola, Fla., by Dr. Charles Mohr, during February. The bark of the tree yielded 1.70 per cent. of ash and 3.56 per cent. of tannin, calculated for the absolutely dry substance, and contained 7.44 per cent. of moisture. The microscopic structure of the leaf and stem, in cross section, is shown by cuts, and described. The wood of the tree is soft and white.

*Pinus Montana*, Du Roi, the Dwarf, or Mugho pine of Southern Europe, is frequently planted in American parks and gardens, and is merely a shrub, or small bushy tree, seldom attaining a height of more than 8 or 10 feet. The microscopic structure of the leaf and of the stem in cross section is shown in cuts and described. A diminutive tree also, though attaining a height of from 15 to 40 feet, is our indigenous

*Pinus Virginiana*, Miller (*Pinus Inops*, Aiton), the "Scrub Pine" or "Jersey Pine," a straggling tree which grows in poor soil from Long Island to South Carolina, and westward to Kentucky. The bark collected in Southern New Jersey during November, contained 12.92 per cent. of moisture, and yielded 2.01 per cent. of ash and 4.82 per cent. of tannin, calculated for the absolutely dry substance. A description of the leaf and stem bark is given, accompanied by cuts, showing these parts in cross section. Though rich in resin, the small size of the tree precludes its utilization for the collection of turpentine, the principal use of the tree being for fuel.

*Pinus Sylvestris*, Linne, the Scotch fir or Scotch pine, though a native of Europe and Northern Asia, is much cultivated as an ornamental tree in this country. After giving the usual description of the microscopic structure of the leaf and stem, the authors give the following results of the examination of specimens grown in the vicinity of Philadelphia and collected during the month of November:

	Moisture.	Ash in absolutely dry substance.	Tannin in absolutely dry substance.
Leaves.....	7.50	3.46	6.84
Stem bark.....	10.07	2.63	16.91
Root bark .....	10.04	2.66	13.17

The tannin and other constituents of this valuable tree have been studied by a number of European investigators. It is valued in the countries of its growth for its durable timber, and as a source of much of the tar and turpentine used in Europe. A food is prepared from the inner bark in Norway, whilst the substance used in surgery and known as "pine wool" is manufactured from the leaves.—Ibid, June, 1896, 321-337.

*Long-leaf Pine—Destructive Methods of Collecting the Turpentine.*—L. J. Vance gives some timely information respecting the immense destruction that has been going on for years and continues to go on in the long-leaf pine belt of the South. The destruction of these magnificent pine forests is due partly to the fires caused by careless turpentine workers, and partly to the old-time methods which they pursue of tapping the trees for their sap. The workers are so careless and indifferent as to allow fires to run through tracts in which they have worked. The resin on the scarified trees burns like kerosene; a spark, a blaze, and all at once a disastrous conflagration is sweeping through the pine forests, destroying millions of feet of marketable lumber. Then in the collection of the turpentine they have made few improvements over old-time methods. They cut a deep, broad "box" at the base of the tree, and then the surface above the box is laid bare. The trees are worked four or five seasons, when they become practically exhausted of their sap. The forest is then abandoned to the elements, to the bark-beetles and pine-borers, and, finally, the splendid trees are blown, burned or cut down. The author further observes that if our turpentine workers understood the first principles of forestry they would modify their destructive methods. The French turpentine workers take measures to regenerate their pine forests and to keep the trees strong and uniform. They cut no deep box into the tree, but use pails into which the sap is conducted by a gutter. Only a small chip about three or four inches wide is made, and this is enlarged from time to time. After five seasons working, the trees are given a rest of several years, and so, by alternating periods of tapping and of rest, a tree can be profitably worked for fully fifty years. As a practical result of the wholesale destruction of this important industry of the South—it amounts to \$10,000,000 annually—the author mentions that in North Carolina there has been a decline of 40 per cent. in the production of naval stores, due simply to the exhaustion

of the pine forests.—Am. Jour. Pharm., Oct., 1895, 537-539; from Garden and Forest, July 10, 1895.

*Hemlock Barks—Structure.*—Edson S. Bastin contributes a paper upon the structure of hemlock barks, and gives the results of the microscopic examination of the barks of two American species—

*Tsuga Canadensis*, Carrieré, the common hemlock spruce of our Eastern States, and

*Tsuga Mertensiana*, Carrieré, a native of the Pacific coast of North America. Three other species are known, one of them (*T. Pattoniana* Brewer) being also indigenous to the Pacific coast, while the other two belong to Eastern Asia. The microscopic examination reveals a great similarity of structure in the two barks, though there appear to be some characters which may be relied upon for distinguishing them. Thus an abundance of starch was found in the bark of *Tsuga Canadensis*, but no starch was observable in *Tsuga Mertensiana*, although there was a similar structure and arrangement of medullary ray-cells (which in the other species were particularly rich in starch) and there were the tangential rows of large parenchyma cells, the same as in the other species. It is, however, possible that the absence of starch in the bark of *T. Mertensiana* was only a seasonal difference, and further investigation is consequently required on this point. Another difference, and one that is perhaps most constant, is that, while the medullary rays in both barks are composed of single rows of cells, and these are radially elongated and of large size as compared with the adjacent tissues, those of *T. Mertensiana* are, on the average, larger, and the rays in this species, as seen in a longitudinal-tangential section, are composed of a larger number of cells. The paper is illustrated by cuts showing cross-sections and longitudinal-tangential sections of the two barks, as well as crystals of calcium oxalate which are abundant in both barks. These crystals are frequently associated with the cells containing oleo-resin and coloring matter, while oleo-resin cells appear to be about equally abundant in the two species.—Am. Jour. Pharm., July, 1895, 356-362.

*Burmese Turpentine—Preliminary Examination of Two Samples.*—Prof. Henry E. Armstrong makes a preliminary report on an examination of two samples—obtained in large quantities—of Burmese turpentine, the one derived from *Pinus khasya*, the other from *P. merkusii*. The crude turpentine from

*Pinus khasya* was a gray, thick, pasty mass, containing a quantity of small pieces of wood. It yielded by distillation with steam 13 per cent. of its weight of oil, which is 4 per cent. less than he had obtained from the same variety of turpentine on another occasion, the difference being probably due to collection under more favorable conditions on the previous occasion, and the loss of oil by evaporation in the case of the present sam-

ple. The present examination also confirms the opinion previously arrived at that the oil is strictly comparable with French oil of turpentine. The crude turpentine from

*Pinus merkusii* was more fluid and cleaner in appearance than the first-named sample. It yielded about 19 per cent. of oil, which was very similar to that from *P. khasya*. The sp. gr. at 20° C. was 0.8610, the rotatory power + 31" 45, whilst the sp. gr. of *P. khasya* oil was 0.8627 and its rotation to the right = +36" 28. Both oils, like French oil, distil within a very narrow range of temperature—near to 155° C.—but the oil from *P. khasya* appears to contain a somewhat larger proportion of a constituent of higher boiling point, while that from *P. merkusii* appears to be more uniform.—Pharm. Jour., May 9, 1896, 370.

*Juniper Tar—Characters of Distinction from other Tars.*—Hirschsohn observes that no tests are given for the identification or distinction of juniper tar—which in the South of France is made by dry distillation of several varieties of *Juniperus*—from other kinds of tar in any of the pharmacopœias. He finds that the sp. gr. of juniper tar varies from 0.978 to 1.102. It is only partially soluble in alcohol of 95 per cent., but is perfectly soluble in aniline, in which birch tar is only in part soluble. The aqueous extract of juniper tar gives a red coloration with aniline and sulphuric acid, and in this respect differs from pine tar. With very dilute ferric chloride, the aqueous extract of juniper tar gives a reddish coloration, while birch tar extract gives a green color.—Pharm. Journ., Feb. 29, 1896, 163-164; from Pharm. Zeit. Russl., 1896, 52.

#### CYCADEÆ.

*Macrozamia, Sp.—Investigation of Poisonous Characters.*—Dr. Lauterer has made some investigations respecting the character of a poisonous resin of the "macrozamia plant," which has the reputation in Australia of producing the rickets of cattle. The author finds that the seeds or nuts of the macrozamia are poisonous in their fresh state, causing purging and vomiting, but that they can be eaten with impunity when boiled, or boiled and fried afterwards. On crushing the fruit with water and shaking with ether, a resinous body was dissolved, which proved very poisonous to frogs. The plant does not seem to contain either a poisonous alkaloid or glucoside, nor are the poisonous effects due to a gum, as is the opinion of the Government Veterinary Surgeon of Western Australia, the gum of *Macrozamia* being inert and resembling the metarabin of the bottle-tree.—Chem. and Drugg., Jan. 18, 1896, 71.

#### B. ANIMAL DRUGS.

*Sponges—Mode of Development.*—At the meeting of the Pennsylvania Pharmaceutical Association in 1895, Wm. B. Burk read a paper on sponges in which he gives interesting information concerning their devel-

opment and growth. He observes that even now sponges are popularly regarded as plants, although for many years naturalists have recognized them as members of the animal kingdom, while the investigations of the past twenty-five years have shown them to be animals of by no means the lowest type. Sponges are found in the waters of every part of the globe, and in suitable locations may be exceedingly abundant. So far as known, they are all sedentary animals, constrained, with few exceptions, to pass all but the earliest stages of their existence fastened to the same submerged object to which they became attached in their early youth. The young possess the power of locomotion, and can seek out new places of abode, but the adults must remain in one place and take whatever of food or fortune the passing currents may bring. The sponges have thousands of cavities within the body devoted to performing the functions of digestion. Their organism requires a peculiar skeleton, since the internal tubes and minute stomachs would be liable to compression by the weight of the soft tissues, after the attainment of a certain size, unless some firmer framework was interposed. Such a supporting skeleton is found in most sponges, this framework being formed in some cases by a woven mass of elastic threads, of a horny nature; in others it is composed partly of these threads and partly of stiff and unelastic calcareous or silicious spicules. These are among the most interesting points in the history of the skeleton. The form of the spicules varies greatly, and affords good systematic characters that are useful to the naturalist. The male and female elements are found within the sponge. After fertilization, the egg undergoes a regular segmentation, and then the two ends of the body become distinguishable, one being composed of smaller cells than the other. These young larvæ swim rapidly through the water by means of the cilia, or small hairs, which clothe the exterior, and which can be moved like so many oars with force and at the will of the tiny animal. After a time it settles down, with the mouth below, upon the space to which it is to become attached. The membranes at this end form a sort of sucker, which spreads itself out, and enables the animal to exclude the water between it and the surface to which it is applied.

There are only six species of *Spongia* which are offered for sale, though there are numerous varieties. Three of these species are from the Mediterranean and Red Sea, and three from the Bahamas and Florida. Other species have a very general distribution, but they are all confined to the equatorial and temperate zones, with an area on either side of the equator, which is limited by the average temperature for January of 50° F. The marketable sponges owe their excellence to the closeness, fineness and resiliency of the interwoven fibres of the skeleton. The Mediterranean appears to be particularly favorable to the production of specimens with skeletons possessing these desirable qualities in greatest perfection. Those from the Red Sea are next in rank, while those of our own shores,



though corresponding species to species with those and the Mediterranean forms, are coarser and less durable. The foregoing is only an imperfect abstract of this highly interesting paper, which see in Proc. Pennsylvania Pharm. Assoc. 1895, 143-147.

*Sponges—Presence of Large Percentage of Iodine in Some Varieties.*—Fr. Hundeshagen has found that a number of sponges, all of them from tropical or sub-tropical localities and belonging to the *Asplysinidea* and *Spongidea*, such as *Luffaria*, *Asplysina*, *Verongia*, *Stelospongos*, *Cacospongia*, etc., contain large percentages of iodine—up to 14 per cent.—as well as considerable quantities of bromine—1 to 2 per cent.—and chlorine in organic combination. Other sponges from the same tropical waters, particularly the forms closely related to the bath sponges, such as *Euspongia*, *Euchalina*, *Chalinopsis*, and the like, on the contrary contained very little iodine. He finds that in the first-named class of sponges, which might conveniently be designated as “Iodine-sponges,” the iodine is in combination with an albuminoid body similar to “spongin,” which he proposes to designate by the name of

*Iodospongin*, whilst the bromine and chlorine compounds of the same substance would be designated as “bromospongin” and “chlorospongin” respectively. Iodospongin is very slightly soluble only in the ordinary organic solvents, such as alcohol, ether, chloroform, etc., and water only dissolves traces even when the substance is boiled with it. Under pressure, however, the substance is dissolved more or less completely, but the compound is decomposed with formation of ammonium iodide. It is remarkable that, though water under ordinary conditions is without effect upon iodospongin, by the action of ferments it is readily decomposed with liberation of iodine. It is decomposed by concentrated mineral acids with elimination of iodine vapor. The enormous percentage of iodine contained in these “iodine-sponges” points to their practical utilization as a source of iodine, since they contain about one hundred times as much as the sea-weeds. Unfortunately they do not appear to exist in quantities sufficiently abundant for this purpose, though it may be possible to secure an abundant supply by a method of cultivation.—Pharm. Centralh., Sept. 12, 1895, 528-529; from Zeitschr. f. Angew. Chem., 1895, 473.

*Leeches—Utility as Weather Indicators.*—It is noted by the “Journal d'Hygiene” that a leech is an excellent barometer. When it remains curled up at the bottom of the containing vessel (aquarium) the weather will be fine; if it rises towards the surface, unsettled or rainy weather is indicated. If it moves about rapidly it foretells much wind, and if it indulges in convulsive somersaults thunder is at hand.—Pharm. Jour., Aug. 24, 1895, 169.

*Beeswax—Examination, Adulterants, etc.*—Lyman F. Kebler contributes a lengthy paper on the origin of beeswax, the comb foundation, fraud

in the trade, adulteration in England, adulterants and substitutes, and on the characters of a pure wax. Respecting the origin of beeswax he observes that whatever may be the true theory regarding its production, three facts are indisputable: 1. That genuine beeswax has yet to be produced in which the special life action of the bee or allied insects has not taken a part. 2. No considerable quantity of beeswax has ever been produced by bees that have not had access to flowers. 3. From whatever quarter of the globe a beeswax may be accumulated, and whatever may have been its environments, the chemical composition is always approximately uniform. Substitutes and adulterants of beeswax are: *Carnaüba* or *Brazil wax*; *ceresin* or *cerite*; *China wax* (distinctly the secretion of an insect); *Japan wax* (frequently confused with China wax, but distinctly a vegetable wax); *Vegetable wax* (a term now confined to a kind of wax produced in India); *paraffin* or *paraffin wax*; *rosin*; *stearic acid*; *tallow*. Besides, several inorganic substances are used to increase weight, color, etc., such as chrome yellow, litharge and yellow ochre. These may often be detected with the naked eye or the aid of a lens; otherwise by melting the wax and allowing it to cool slowly, when the heavy inorganic substance will settle to the bottom, and is readily recognized. The other adulterants are recognized by observing the physical characters, and by determining the acid number and the ether number of the sample by Hübl's method.

Pure beeswax has either a straight or a convex upper surface, never a concave surface; the latter indicates the presence of ceresin or allied bodies. It is characterized by shrinking away from the sides of the vessel on cooling after having been melted, and it will do this also in the presence of a small percentage of ceresin, but not in presence of larger proportions, since ceresin and allied products do not shrink away on cooling. The next points to be determined in the examination of adulterants are the specific gravity and the melting point, for which operations the author gives practical directions. These two, with the determination of the acid number and the ether number (the determination of the free acid and of the neutral saponifiable fat), serve for the identification of the sample by the aid of the following

TABLE OF CONSTANTS FOR WAX AND ITS ADULTERANTS.

Substance.	Melting Point °C	Sp. gr. at 15° C.	Acid Number.	Ether Number.	Ratio.*	Total.
Yellow beeswax ..	62-64	0.961-0.964	19-21	73-76	3.5-3.8	91-97
White beeswax...	63-64	0.960-0.973	19-23	74-84.3	3.5-3.8	93-107.3
Cacao butter.....	30-34.5	0.945-0.982	0-3	192-204	—	192-207
Carnaüba Wax...	83-84	0.990-0.999	4-6	75-76	18.7-12.6	79-82
Ceresin or Mineral Wax .....	60-84	0.918-0.952	0—	0—	0—	0—
China Wax .....	81-83	0.970	0—	63—	—	63—
Japan Wax.....	47-54	0.963-0.984	18-28	194-200	10.7-7.1	212-228
Paraffin Wax.....	38-74	0.913-0.914	0—	0—	0—	0—
Resin .....	53-5	1.104-1.108	146-173	10-21	—	156-194
Spermaceti .....	40-50	0.943-0.960	0-2	120-130	—	120-132
Stearic Acid .....	58.5-69.2	0.901-1.000	204—	5—	—	209—
Tallow .....	42-50.5	0.942-0.960	2.75-5	193-208	—	195.75-213
Vegetable Wax ..	47-55.6	0.947	17-19	200-210	11.7-11	218-220

\* Ratio of acid number to ether number.

The author closes his very comprehensive paper with a table giving the results of the examination on these lines of twenty-one specimens of yellow beeswax, of which five were found to be pure, the others being adulterated with one or more of the following substances: Stearic acid, chrome yellow, rosin, ceresin, yellow ochre, earthy matter, hæmatite, paraffin.—Am. Drug. and Pharm. Rec., July 10, 1895, 3-5.

In a subsequent note (Ibid. July 25, 37), the author calls attention to some disparaging criticisms by E. J. Parry on Hübl's method, in the British and Colonial Druggist, June, 1895. Mr. Parry makes the point that a mixture composed of 37 p. carnauba wax, 24 p. Japan wax, 32.4 p. ceresin and 6.60 stearic acid, complies with the constants of beeswax in specific gravity, melting point, and acid and ether numbers, and he considers an examination of the fat acids a very important test. Mr. Kebler admits the value of the later test, and while he realizes fully that mixtures resembling beeswax in many particulars can be made in skilled hands, such frauds can easily be detected by the specific tests at our command.

*Zanzibar Wax—A Remarkable Parcel.*—The "Chemist and Druggist" (Aug. 24, 1895, 323,) calls attention to a parcel of "Zanzibar wax," consisting of a 147-lb. bag of a dull, gray sandy-looking substance, offered as beeswax, "or whatever it may be." It was purchased cheaply on speculation, but proved to consist of 72 per cent. of good beeswax and 28 per cent. of extraneous matter in the shape of earth, hair, etc. The chloroform extract yielded a wax of good color, with a melting point at 143° F., and free from hard paraffin.

*Honey—Microscopic Distinctions of the Natural and Artificial Product.*—Karl Dietrich records experiments made to determine the utility of the

microscope for distinguishing between natural and artificial honey. The substances that are to be considered in a microscopic examination of honey are pollen-granules, sugar crystals, wax, vegetable and animal fragments, and starch grains, the latter being derived in genuine honey from the flour used for stupefying the bees. Of these, the most important is the identification of the pollen. It has been contended that artificial honey is distinguished by the absence of pollen. But this is disproved by the author's observations, and naturally so, because all artificial honey contains a portion of natural honey. But the significance of the author's observation is in the fact that the pollen found in the artificial honey examined was distinct from the pollen found in natural honey, and he expresses the opinion that by following up this line of examination, it may be possible to arrive at definite conclusions respecting adulterations of honey, from the character of the pollen grains contained in a sample. Other elements that aid the distinction between natural and artificial honeys are the sugars. Genuine honey exhibits under the microscope the characteristic crystals of cane sugar and of glucose. Artificial honey shows the same crystals, but those of cane sugar are present in sparing quantities only. Of other characteristic elements—wax, vegetable and animal fragments—these were found in artificial honey also, their presence confirming that the artificial article is a mixture of sugar syrups with natural honey.—*Pharm. Centralh.*, Oct. 17, 1895, 592-594.

*Australian Honey—Analysis of Several Samples.*—F. B. Guthrie has subjected four samples of Australian honey to analysis, with results as follows :

Sample.	Water at 100° C.	Ash.	Dextrose.	Levulose.	Cane sugar.	Combined water and unknown.
1	21.62	.23	37.21	32.23	3.70	5.01
2	19.02	.19	38.16	33.24	1.80	7.59
3	16.20	.03	32.30	31.80	13.60	6.07
4	21.56	.42	35.57	36.90	1.20	4.35

The origin of these samples was more or less definitely known. No 4 was a sample in comb, and appeared to have granulated slightly, the left handed sugar being consequently in excess of the dextrose. A considerable quantity of pollen, wax, etc., was present in the same sample, the large quantity of ash being thus explained. No. 3 was regarded with some suspicion by the bee-keepers, and the abnormal quantity of cane sugar rendered its purity doubtful. At the same time it is well known that bees fed on cane sugar yield honey containing an excess of that substance, and the author considers it would be unsafe to assert positively that the sample represented an adulterated article.—*Pharm. Journ.*, Feb. 29, 1896, 165 ; from *Agricult. Gaz.*, N. S. Wales, vi, 793.

*Ambergris—A Monster Lump.*—The finding of a very large lump of ambergris is reported in "Chem. and Drugg." (Nov. 2, 1895), and is shown in an illustration accompanying the notice. It was received in consignment from Fiji, measures 32 inches in circumference in its widest part, weighs 284 ounces, and is valued at 1,350£. The bulk of the piece is of a gray color, the tint varying from slaty to brownish-yellow. The lump has three "hearts" of fine pale- and silver-gray color, which form its most valuable portion.

*Cod-liver Oil—Pharmacopœial Characterization.*—On the basis of his examination of genuine cod-liver oil and comparison with the characters of other oils, W. Dulière finds the specific gravity stated by the Belgian Pharmacopœia (.920 to .922) too low, and recommends the addition of a maximum acidity permissible, as well as limits within which the saponification number, iodine number, index of refraction, and heat evolved with sulphuric acid should be stated.—Pharm. Jour., Feb. 29, 1896, 164; from *Annales de Pharm.*, ii., 41.

*Cod-liver Oil—Determination of Constants.*—E. J. Parry and C. E. Sage, in view of the fact that the published constants of cod-liver oil are very varying, have determined some of the most useful analytical figures in ten samples of oil of whose authenticity they were assured. Their sp. gr. ranged from 0.9227 to 0.9291; their saponification numbers were within the limits of 17.90 and 19.34 per cent. of KOH; the iodine absorption figures between 153.5 and 168.4 per cent.; the free acids varied from 0.34 to 0.60 per cent.; the melting points of the fatty acids, obtained by saponifying the oil and decomposing the resulting soap, ranged from 21.5° to 25° C.; the iodine number of the fatty acids, in four samples, ranged from 164.9 to 170.1; while the mean molecular weight of these acids ascertained in four samples was 288.2, 288.6, 287.6 and 292.5.

## INORGANIC CHEMISTRY.

(Including Physics.)

*The Röntgen X Rays.—Account of the Discovery.*—The Vienna correspondent of the London "Standard" gives some interesting details respecting the remarkable scientific discovery made by Professor Röntgen of the University of Würzburg, Bavaria. The professor came upon his discovery quite by accident. He was experimenting in the dark with a Crookes' vacuum tube, which was covered with some sort of cloth. A strong electric current was passed through it, while close by there was some prepared photographic paper, but no camera. On this paper the professor noticed

next day several lines for which he could not account. By restoring exactly the circumstances as they existed on the preceding day, he was able to ascertain the real origin of these mysterious marks. He continued his experiments with the Crookes' tube and photographic paper, and found, in the first place, that not only may a camera be dispensed with, but that the image from the light rays of the Crookes' tubes is not obtained if it has to pass through lenses. By the use of these rays photographing is immensely simplified. There is the vacuum tube ; in front of it is the object to be photographed, and immediately behind the object is the prepared paper, in a wooden case, wood being transparent to these rays. An ordinary plate, whether wet or dry, must not be exposed to daylight until after fixing. But in the case of the Röntgen rays this difficulty does not exist, because the sensitized paper can be left in the wooden case, and, therefore, in complete darkness. But that is not all. Professor Röntgen has found that these peculiar rays are not refracted, which is the reason for the inapplicability of lenses or the camera ; and he further found by experimenting that they develop no heat, and that they are without influence upon the most sensitive magnetic instruments. He also found that these rays possess this extraordinary peculiarity : they do not travel in undulating waves, but by moving forward in a direct line. The theoretical interest attaching to this last peculiarity is enormous.

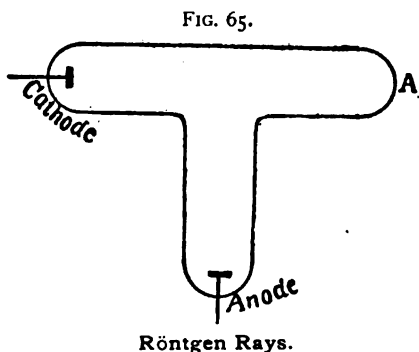
The first photograph of a human hand, showing only the bones and the rings on the fingers, was obtained by Prof. Röntgen placing his own hand on the wooden case containing the prepared paper, and allowing the rays from the Crookes' tube to fall directly upon it. Prof. Röntgen has sent rays of the new chemical light through aluminium of one and a half centimeter in thickness, and they went as clear through as if the substance had been wood. The same was the case with two sets of books, including many volumes. Other experimenters confirm these observations of Prof. Röntgen, and add that all substances experimented with—even ebonite, carbon, vulcanized fibre, copper, and iron—appear to be transparent to these rays, though there is considerable variation in the degree.—*Pharm. Jour.*, Jan. 18, 1896, 58.

*Röntgen X-rays—Comparison with Hertz's Electric Light Waves and Hittorf's Kathode Rays.*—Prof. Röntgen's account of his discovery, as given in the "Transactions of the Würzburg Physico-Medical Society," differs in no essentials from the above abstract. In respect to the effect of the new rays upon the eye, he observes that the retina of the eye is not sensitive to them, even if the eye is applied close to the discharging apparatus. Experiments made with water and carbon disulphide in prisms of mica, and again with finely-pulverized substances, showed that the X-rays are scarcely, or not at all, refracted. Hence the rays cannot be concentrated with a lens. With the reflection of the rays the case is similar. The rays differ from Hittorf's kathode rays, especially by the fact

that they are not deflected by the magnet. That part of the wall of the discharging apparatus which fluoresces most strongly must be regarded as the initial point of the X-rays. Hence they proceed from the point on which the kathode rays impinge. If the kathode rays are deflected by a magnet within the apparatus, the X-rays proceed from another point, *i. e.*, again from the terminal point of the kathode rays. If the X-rays were violet or kathode rays, they must behave quite differently from the ultra-red, the visible, and the ultra-violet rays. Prof. Röntgen conjectures that the X-rays may be due to longitudinal vibrations of the ether.

Prof. Boltzman, in considering Röntgen's discovery, adheres to the views of the former, and extends his hypothesis, placing along with the three kinds of luminous rays—ultra-red, visible, and ultra-violet—the electric light waves of Hertz. But he claims for the kathode rays and Röntgen's X rays a different nature. In the two latter he recognizes longitudinal waves, which in the kathode rays are of extremely short wave-lengths, but of greater wave-lengths in those of Röntgen, while the Hertz rays are transversal and of greater wave-lengths than either of the other two. He regards the chief signification of Röntgen's discovery that we are again made acquainted with a new agency. The discovery of Hertz's rays and of the kathode rays, has occasioned a justifiable sensation. The former, however, are not essentially different from light-waves, and the latter are almost exclusively confined in the narrow limits of the Hittorf tube, and are therefore sparingly accessible either for science or for practice; the phenomenon of the Röntgen rays is entirely new, and is accessible on a large scale.—Chem. News, Jan. 31, 1896, 49.

*Röntgen Rays—How They Are Made.*—Dr. M. L. Pupin, in a lecture delivered under the auspices of the Engineering Society of Columbia College, gave the following simple description of the production of the Röntgen rays: If a high vacuum be produced in a glass tube, and if a current



of electricity of exceedingly high tension be passed through this vacuum, a distinct luminosity appears in the tube. The electricity is allowed to enter the tube by means of platinum wires terminating in disks, which are fastened in the glass at each end of the tube. If the negative terminal—kathode—and the positive terminal—anode—be placed as shown in the diagram (Fig. 65), and the luminosity dimin-

ished, the luminous rays emanating from the cathode-terminal, instead of following the electric circuit to the anode-terminal, will pass by it, to the

point *A*, where a fluorescent effect will be produced on the glass. These luminous waves are known as "kathode streamers." In 1892, Dr. Paul Lenard, of Bonn, made an opening at that part of the glass where the fluorescence appeared, placed a small piece of aluminium over this opening, and found that the kathode rays passed through the metal and caused a fluorescent effect. Röntgen rays are a kind of continuation of these kathode rays, and are in many respects analogous to them. No substance is absolutely opaque to these rays, but the impression produced depends upon the density of the subject photographed.—*Amer. Drugg.*, Mar. 10, 1896, 149.

*Röntgen Rays—Permeability of Various Substances and Comparison with the Kathode Rays.*—Gossart and Chevalier, while engaged in some experiments upon the Röntgen X-rays and the Kathodic rays of Crookes, endeavored to manifest at a distance the heating of the Crookes tubes by means of his radiometer. To their surprise the vanes of the radiometer not merely remained motionless before a very hot tube, but, even if once set in motion by means of extraneous heat, they stopped in front of the tube with a very fixed orientation, and after pendulum oscillations which were the more rapid as their distance from the tube became less. It was evident that they were here confronted with a mechanical action due to a field of force erected in the radiometer and antagonistic to that of heat. They have verified the existence of this field of force around the Crookes tube, and have proved by some twenty substances that this force traverses the same media, or is arrested by the same substances, as the X-rays. The further experiments of the authors were particularly directed to the transparency of the substances for the force of the photographic action. They find the following substances to be pervious to both radiations: Pasteboard, ebonite, felt (layer of 2 Cm.), sulphur, paraffin (1 Cm.), wadding. As opaque bodies they indicate in the order of decreasing opacity: Lead, copper, aluminium, ivory, retort-coke.—*Chem. News*, Febr. 28, 1896, 98; from *Compt. rend.*, cxxii, 316.

*Röntgen Rays—Permeability of Various Substances and Influence of their Chemical Nature.*—Maurice Meslans has undertaken to examine what is the relation that may exist between the transparency (permeability), of certain substances to the Röntgen rays and their chemical nature, and if these rays may not furnish a new means of investigation in the domains of chemistry. The results obtained with about fifty substances, though incomplete, seem to him to offer some definite conclusions, and determined him to pursue his study further. He finds that diamond, graphite, anthracite, sugar, charcoal, give in photographic images a faint tinge of tonality similar to that of wood or of paraffin of an equal thickness, whilst sulphur, selenium, phosphorus, iodine, afford very strong images of great opacity. The organic substances, ethers, acids, nitrogenous substance, were easily traversed by the X-rays, and gave images



scarcely perceptible ; but the introduction into the organic molecules of a mineral element, such as iodine, chlorine, fluorine, sulphur, phosphorus, etc., gives to the molecule a great opacity. The sulphates of the alkaloids are in this case. In like manner iodoform is very opaque, whilst the alkaloids, picric acid, magenta, and urea, are very opaque. Phthalyl fluoride is more opaque than phthalic acid, although the molecular weights of the two bodies approximate very closely. The metallic salts possess a great opacity, but it varies with the metal and the acid. These results are corroborated by the photography of hands and of entire animals executed by Professor Röntgen and others. Here the muscles and other substances composed entirely of carbon, hydrogen, oxygen, and nitrogen, remain transparent, whereas the bones, containing mineral elements, give strong images.—Chem. News, Feb. 28, 1896, 97 ; from Compt. rend. cxxii. 309.

*Röntgen Rays—Increased Photographic Yield by the Aid of Phosphorescent Zinc Sulphide.*—Charles Henry records some experiments by which he has become convinced that it is possible, by coating with phosphorescent zinc bodies capable of absorbing Röntgen's rays, to render visible on the photographic plate objects situated behind such bodies and otherwise invisible. The zinc sulphide appears to fulfill the office of a supplementary actinic source ; it converts the Röntgen rays into photographic rays, and the X-rays being inert in this respect, this is another proof of the complexity of the radiations emitted from the Crookes' tube. Furthermore, the author has made experiments with phosphorescent zinc sulphide which seem to confirm the hypothesis of Henri Poincaré, "that all bodies whose phosphorescence is sufficiently intense emit in addition to luminous rays also the X rays of Röntgen, whatever may be the cause of their fluorescence.—Chem. News, Feb. 28, 1896, 98–99 ; from Compt. rend., cxxii, 312.

*Röntgen Rays—Application in Surgical Diagnosis.*—Lannelongue and Oudin call attention (in "Compt. rend., cxxii, 283), to experiments made with the X-rays upon the human body, with the view to locating diseases of the bones, and record two cases—one of osteo-arthritis of the knee, the other of osteitis of the femoral diaphysis in the thigh of a child, in both of which cases their previous diagnosis was confirmed.

In the same direction, Albert Londe (Ibid., 311), has exhibited a photograph by the Röntgen method of the pinion of a pheasant killed by shooting, which plainly exhibits the fracture of the bone, as well as a shot which had been embedded in the flesh. As a matter of practical importance, this author calls attention to the fact that the photographic plates behave with the X-rays exactly as with light.

A third paper in the same line is that of Ch. V. Zenger (Ibid., 315), in which he calls attention to three photographs submitted to the Academy with his paper. The first is that of the hand of his assistant, which plainly shows the bones, the motor muscles, and a gold ring. The second is a

hand into which four fragments had penetrated in the thumb; three of them had been extracted, the fourth fragment was plainly visible. The third photograph is that of a hand affected with Morvan's disease. The progressive destruction of the bones is here shown by the parts attacked presenting a greater transparency.—Chem. News, Febr. 28, 1896, 97 and 99.

*Röntgen Rays—Utility in Examination of Vegetable Substances.*—FERNAND Ranwez directs attention to the fact that the Röntgen rays can be utilized in analytical examinations, more particularly in the examination of vegetable food stuffs, since by their aid the presence of any mineral can be discovered quickly, accurately, and without affecting the sample under examination. Moreover, a number can be examined simultaneously. The author was thus enabled to discover an adulteration in three samples of saffron with barium sulphate, which had been used so skillfully that the mineral substance was not noticeable to the naked eye, notwithstanding that the samples contained respectively 22.21, 28.69, and 62.13 per cent. of the adulterant.—Amer. Drugg., May 25, 1896, 303; from Compt. rend.

*Shadow Pictures Produced by Sunlight Through Hard Rubber Slides—Are they Röntgen Rays?*—This is the question put by Prof. Edson S. Bastin, who, having observed some years ago that, when his plate-holder containing dry plates was exposed to direct sunlight, fogging was the result, placed some copper pennies and a key to the rubber slide of the plate holder of a Corona camera, and beneath the coins and key an ordinary dry plate, and, after covering the margin of the plate holder with black paper, exposed the same for two hours to direct sunlight. On development, there was a very distinct shadow picture of the coins and key, which is in evidence in a photo-lithograph accompanying the author's paper, in Amer. Jour. Pharm., March 1896, 142-143.

*Photography in the Dark—Production of Proofs, and Hypothesis.*—A. Besançon has submitted to the French Academy two photographic proofs obtained in the dark, under the following conditions: On the glass of a frame for positives a leaf of black card-board was applied so as to cover it completely. Two sensitive plates were arranged upon this leaf, and upon these plates a twig of cypress and a fish enveloped in a sheet of black cardboard, and above all a bed of blotting paper. The frame was then closed with its lid, and the whole was wrapped in several thicknesses of black cloth. These operations were performed in the camera. The packet was deposited in a box hermetically closed, in a room well closed, and when again opened after two hours the proofs were developed. The negative images of the objects, however, were light instead of, as under ordinary conditions, black. The author made these experiments with a view to verifying a hypothesis which would explain the transmission of light through opaque bodies, viz., that all bodies allow themselves to be saturated with

luminous rays, and, when once saturated, give off the light which they have received, and can thus in darkness act upon sensitive plates. While the results do not seem to fully confirm this hypothesis, they do confirm that a body which has been exposed to light impresses a sensitive plate in darkness.—Chem. News, Mar. 6, 1896, 119; from Compt. rend., Feb. 17, 1896.

#### NEW ELEMENTS.

*Argon and Helium—Historical Review.*—Alfred R. L. Dohme communicates an interesting historical review of the two recently discovered elements, argon and helium, a brief abstract of which may find place here. Attention was first directed to

*Argon*, on the last day of January, 1895, by Lord Rayleigh and Prof. William Ramsay, as a new constituent of the atmosphere, its determination being the outcome of experiments made by these chemists jointly because of the observation made by Lord Rayleigh, towards the close of 1894, that nitrogen extracted from chemical compounds is about 0.5 per cent. lighter than the nitrogen from atmospheric air. In the course of their joint experiments they found that "chemical nitrogen," obtained from a variety of substances, such as nitrous and nitric oxide, ammonium nitrite, urea, etc., had a specific gravity approximating very closely and averaging 2.2990, whilst "atmospheric nitrogen" was found to have a density of 2.3102. This discrepancy, though at first attributed to impurities in the atmospheric nitrogen, was determined to be due to a gaseous body not hitherto described, in fine a new element, to which the experimenters gave the name argon. It is noteworthy that Cavendish (1785) had already observed that after sparking "phlogisticated air," *i. e.*, nitrogen and oxygen, confined with potash over mercury in an inverted U tube, some always remained that could not be converted into nitric acid, and that it constituted about  $\frac{1}{15}$  part of the whole. A repetition of this experiment by Rayleigh and Ramsay proved, in confirmation of Cavendish's observation, that the amount of his unsparkable gas was proportional to the amount of air operated on. Argon was made in quantity from air by removing successively the constituents of the latter: moisture by phosphorus pentoxide; oxygen by sparking with hydrogen; carbon dioxide and nitrous acid by means of caustic alkalies; and, finally, nitrogen by means of red-hot magnesium and magnesium vapor. They, furthermore, proved that "Chemical Nitrogen" contains only a little more than one-tenth as much argon as "Atmospheric Nitrogen," doubtless introduced from the air and the water used. The density of argon was found to be 19.70 ( $H_2$  being taken as 1) when made by the Cavendish oxygen method, while when made by means of magnesium it was found to be 19.90. It has been liquefied by Professor Olszewski, and also solidified by the combined action of extremely high pressure and low temperature, and was obtained in white

crystals, which melt at  $-189.6^{\circ}\text{C}$ . Its critical temperature is  $-121^{\circ}\text{C}$ ., its boiling point is  $-187^{\circ}\text{C}$ .; and having a definite melting point, boiling point and critical temperature, argon is indicated to be a single element, its molecular weight (identical with its atomic weight,) being probably 40. On the other hand, the studies of its spectrum by Prof. Crookes indicate that argon is a mixture of two gases, since it appears to possess two spectra, which he thinks he can separate. As to

*Helium*.—Professor Ramsay, when studying the nature of gases obtained by heating minerals, in April, 1895, obtained argon from some, but from many obtained a very light, colorless gas, that was lighter than argon and gave a different spectrum, and in particular gave a brilliant  $D_3$  line in the yellow. This line had heretofore been noticed in the solar spectrum, and, thirty years ago was attributed by Lockyer and Frankland to a hypothetical element, which they named helium. In his experiments Prof. Ramsay used mainly clèveite and bröggerite, because they were most available, in which, as well as in other minerals, it must be held mechanically. The impurities of the gas resulting by heating these minerals were removed as follows:  $\text{CO}_2$  by potassium hydroxide; water vapor by phosphorus pentoxide; hydrogen by sparking with an excess of oxygen, removing the excess of the latter by means of pyrogallous acid; nitrogen by red-hot magnesium and its vapor. The density of helium is found to be 2.13 ( $\text{O} = 16$ ). It appears to be monatomic, and its atomic weight is consequently 4.26. It is very slightly soluble in water, one volume absorbing only 0.0073 volume of the gas. It is insoluble in absolute alcohol and in benzene. Its spectrum is made up of several lines in the red, orange-red and yellow.

An analogy exists between argon and helium. Both are very inert and cannot be separated when mixed, on account of their similarity in properties. Their densities and spectra, however, plainly prove their difference. Both are unattacked by oxygen when sparked with it, and both are unattacked by the vapor of magnesium. Both are monatomic.—*Amer. Jour. Pharm.*, Nov., 1895, 547-554.

*Argon and Helium—Occurrence in Certain Pyrenean Sulphur Waters*.—C. Bouchard has examined the gases disengaged from certain sulphurous waters in the Pyrenees. After removing the nitrogen, etc., from the collected gases, the residue from one source showed the characteristic bands of argon and helium, while that from another source showed helium bands only. In one specimen of the latter some other element—not argon—was indicated along with the helium.

Some particulars concerning the combination of the argon and helium obtained by Bouchard with magnesium are also given by L. Troost and L. Ouvrard, who find that these elements do not combine with the metal at a red heat, but will combine with its vapor under the prolonged influence of powerful shocks from a Ruhmkorf coil. It is stated that platinum will pre-

vent the same phenomena of vaporization and combination with argon, under the conditions described.—Pharm. Journ., Sept. 28, 1895, 261; from Compt. rend., cxxi. 392–394.

*Argon and Helium—Presence in high proportion in the Gas of the Mineral Spring of Maizières.*—Ch. Mourew, referring to the discovery by Bouchard of argon and helium in the gases of the springs of Bois, states that he has recognized the same two elements in another natural gas which escapes abundantly in large bubbles from the spring of Maizières (Côte d'Or). The water of Maizières is a lithium water containing a little calcium sulphate, and it has at the source the temperature of  $+12^{\circ}$ . Analysis has shown the gas of this spring to contain about 2 per cent. of oxygen, and rather considerable quantities of the new elements—from one-fifteenth to one-tenth of the total volume—the main bulk being nitrogen.—Chem. News, Dec. 27, 1895, 310; from Compt. rend., cxxi, 819.

*Helium and Argon—Occurrence in the Gas of Wildbad Springs.*—Prof. H. Kayser announces the occurrence of both helium and argon in the gas that bubbles up in the springs of Wildbad, in the Black Forest. His experiments also lead him to consider it beyond doubt that helium is a constituent of the air of Bonn, where the author resides. He considers it an interesting inquiry whether the presence of these gases in the springs of Wildbad has any connection with their hygienic efficacy, and whether the gases occur in similar springs.—Chem. News, Aug. 23, 1895, 89.

*Argon and Helium—Compounds with Magnesium.*—L. Troost and L. Ouvrard find that argon and helium, which do not seem to combine with magnesium heated to redness, combine with this metal, or rather with its vapor, under the prolonged influence of powerful effluves. They find, furthermore, that in the case of argon, platinum presents phenomena analogous to those presented by magnesium.—Chem. News, Sept. 17, 1895, 153; from Compt. rend. cxxi., 394.

*Helium—Atomic Weight.*—N. A. Langlat describes the method by which he obtained pure helium, *i. e.*, a gas which displays in Geissler's tube only the spectral lines ascribed to the hypothetical solar element "helium." He has determined the specific gravity of this gas to be 0.14 (air = 1), or 2.00 (H = 1), and that it is a monatomic element, the atomic weight of which is 4 (H = 1).—Chem. News., Nov. 29, 1895, 259; from Zeitschr. f. Anorg. Chem., x., 287.

*Argon—Determination in Atmospheric Nitrogen and in Air.*—Th. Schloessing, Jr., has experimented with the view to establishing a reliable method for determining argon in air and atmospheric nitrogen. Following the example of Lord Rayleigh and Prof. Ramsay, he absorbs the nitrogen, in normal air for instance, by means of magnesium after having eliminated the oxygen and carbonic acid, but he employs for this purpose an arrangement which can be described intelligently only with the illustration

accompanying his original paper. The author's procedure has been carefully verified, and he has by his method determined that normal air yielded as a mean 1.183 vol. of argon to 100 vols. of atmospheric nitrogen (nitrogen and argon) contained in it, or 0.935 vol. to 100 vols. of the air.—Chem. News, Nov. 1, 1895, 211-212; from Compt. rend., cxxi., 525.

*Argon - Separation from Atmospheric Nitrogen.*—C. Limb states that the best method of separating argon from atmospheric nitrogen is to absorb the latter by means of lithium, but that the expense involved is too great. He suggests, therefore, that barium fluoride or barium and sodium fluoride should be gently heated to liberate the barium, which also absorbs the nitrogen energetically. This should be done in an iron tube through which air, deprived of moisture, carbon dioxide and oxygen, is passed. Experiments are to be made to test the feasibility of this process, which, if successful, will greatly reduce the cost of producing argon.—Pharm. Jour., Dec. 28, 1895, 534; from Compt. rend., cxxi., 887.

*Argon—Combination with Carbon Disulphide.*—The knowledge of the action of carbon disulphide upon nitrogen when submitted to the electric effluve has led Berthelot to try the same influence on argon, and he has succeeded in obtaining a compound of argon and carbon disulphide which has characteristic properties, and from which he was able again to separate argon having all its original properties.—Chem. News, July 5, 1895, 1-2; from Compt. Rend., cxx., 1316.

*Argon—A possible Compound with Carbon*—Prof. Wm. Ramsay communicates some preliminary notes on a possible compound of argon with carbon. An electric arc was made *in vacuo* between two thin carbon rods, inclosed in a globular bulb, which was then filled with argon, and placed in communication with a graduated reservoir of dry argon. After causing the arc to act for some hours, the pressure being always somewhat above that of the atmosphere, to prevent leakage inwards, the volume of gas, after all was allowed to cool, had *increased* by about one-fifth. No alteration of volume was caused in this gas on exposure to water, to caustic soda, or to ammoniated cuprous chloride: hence the gas contained no carbonic anhydride or oxide. The spectrum of this gas, while showing a faint argon spectrum, exhibited a very finely channelled spectrum, so luminous as to give the impression of a continuous spectrum, together with certain lines which are not coincident with argon lines.—Chem. News, August 2, 1895, 51.

*Argon—Spectrum of Ramsay's Compound with Carbon.*—Prof. Wm. Crookes has examined the spectrum of the compound of argon and carbon obtained by Prof. Ramsay (see above), and found it to give an extremely luminous spectrum, in which many of the stronger lines of argon are visible—probably caused by excess of argon. He obtained, also, the spectrum of water-vapor, due to moisture doubtless, but in all other re-

spects the spectrum is similar to that of most carbon compounds.—*Ibid.*, Aug. 30, 1895, 99.

*A New Element—Discovery in the Earths yielding Samarium.*—E. Demarcay publishes evidence in support of the existence of a hitherto unknown element in the rare earths yielding samarium. From the earths he has obtained a colorless, slightly soluble nitrate, yielding an oxide which is distinguished by its lack of color, the formation of colorless salts without absorption spectra, and differences between its spectrum and those of the oxides of lanthanum, cerium, gadolinum (discovered by Marignac in samarium earth), ytterbium, and terbium, the only ones so far known that form colorless salts.—*Pharm. Jour.*, May 2, 1896, 341; from *Compt. rend.*, cxxii, 728.

*A New Element—Probable Presence in the Terbias.*—In 1886 Lecoq de Boisbaudran had called attention to an absorption-band observed in certain portions of a fractionation of terbia, which he believed to be characteristic of a peculiar element. The author's experiments since then confirm him in his belief that in the terbia under examination he has discovered the existence of a new element, but his material is now so nearly exhausted that further fractioning has become impossible. In his present paper he gives a brief description of the absorption spectrum of the remainder of the terbia fraction, which is entirely composed of the bands of dysprosium, and of a band which appears to belong to the new element. The object of the present paper appears to be mainly to establish priority of the discovery.—*Chem. News*, Dec. 13, 1895, 292; from *Compt. rend.*, Nov. 18, 1895.

#### OXYGEN.

*Atmospheric Oxygen—Origin.*—T. L. Phipson in a number of previous papers on the origin of atmospheric oxygen has pointed out his observations that lead him to the opinion that the earth's atmosphere originally consisted of nitrogen only, and that the carbon dioxide in the air, water, and earth was subsequently furnished by the action of volcanoes. In this atmosphere of nitrogen, carbon dioxide and water, the primitive plants, were essentially anærobic, and free oxygen was the product of their activity in decomposing the carbon dioxide. The author now summarizes the results of his speculations on this subject in a communication to the Paris Academy of Science, as follows: 1, that in the earliest periods, as at present, nitrogen constituted the major part of the earth's atmosphere; 2, that the presence of free oxygen in the atmosphere is entirely due to the action of vegetation; 3, that existing plants, like their primitive progenitors, are essentially anærobic; 4, that the proportion of free oxygen in the air has been gradually augmented in the course of ages, the anærobic organisms meanwhile adapting themselves at first to a more or less ærobic state of existence, as in the case of fungi, ferments, bacteria, etc., and later

completely ærobie (animal) forms have appeared; 5, that even now the lowest unicellular algæ give out, weight for weight, more oxygen than the superior plants; and 6, that, in proportion as the relative quantity of oxygen in the air has been augmented in the course of ages, the cerebro-spinal nervous system, the highest characteristic of animal life, has become more and more developed, this fact being clearly demonstrated by results of palæontological researches.—Pharm. Jour., Dec. 28, 1895, 533; from Compt. rend., cxxi, 719.

*Oxygen—Value and Use of the Gas as a Restorative.*—Douglass Herman calls attention to the beneficial effects of the administration of oxygen gas to persons suffering from the influence of noxious gases, a not infrequent occurrence in chemical factories. In such cases, as pointed out by the author, an immediate supply of fresh oxygen is wanted in the lungs, and this is most easily provided from a cylinder of compressed oxygen, either by a tube conveying a gentle stream being placed in the patient's mouth while the lips are held tightly around the tube, or by the tube being inserted in one nostril while the other is compressed. A respirator may also be used, covering both mouth and nose. Mr. Herman states that several lives have been saved at works where oxygen has been employed in this way, and he suggests that cylinders of compressed oxygen should always be kept in readiness in places where poisonous gases are likely to be produced and affect the work-people. Oxygen inhalations have also been found useful in cases of drowned persons, and he suggests that it might with advantage be kept in readiness at police stations, etc., as is now done in France.—Pharm. Jour., June 27, 1896, 504; from Jour. Soc. Chem. Ind., xv. 247.

*Ozone—Formation.*—According to Brunk ozone is formed when oxygen is passed over manganese peroxide heated to 400°, and even when the heat is increased nearly to redness it is produced in nearly the same quantities. Cobaltic oxide, argentic oxide and peroxide, nickel oxide, lead peroxide, chromic oxide, uranium oxide, and auric oxide may be used in place of manganese peroxide as ozone carriers.—Pharm. Centralh., Jan. 9, 1896, 26; from Zeitschr. f. angew. Chem. 1895, 226.

#### HYDROGEN.

*Distilled Water—Pharmaceutical Requirements, etc.*—In continuation of a previous paper, J. U. Lloyd records some further experiments made mainly with reference to the keeping qualities of distilled water. He has already mentioned that, by means of a stone condenser, ordinary Ohio river water can be employed to make distilled water that will stand the requirements of the U. S. P. concerning *organic matter*, but that this water when evaporated in platinum invariably left visible rings of *inorganic matter*, the residue so obtained amounting to 1.8 Gm. from 100,000 Cc. of the



water. The results of his present experiments led him to the following conclusions :

(1) It is impracticable (by reason of inorganic impurity) to make distilled water in glass, stone, or ordinary metal condensers that will stand the (following, Rep.) pharmacopœial test :

"When 1,000 Cc. of distilled water are evaporated on a water-bath to dryness, *no residue* should remain." U. S. P.

(2) The pharmacopœial test (permanganate) for organic impurities is not too rigid.

(3) Precautions should be given in the Pharmacopœia that the permanganate test be not applied in a very impure atmosphere.

(4) If the neck of the bottle be protected with an uncorked paper cap or other cover, and the operator is careful not to touch the lip of the bottle with his hand, the water will retain its purity, and the Pharmacopœia can demand that distilled water used for dispensing withstand the present test for organic matter.—*Amer. Journ. Pharm.*, Jan., 1896, 1-4.

In a note (*Ibid.*, April 1896, 187), Mr. Lloyd corrects the passage relating to Dr. Tucker's statement that 100,000 parts of distilled water obtained with glass condensers left on evaporation 2.20 to 23.00 parts of residue. The words "with glass condensers" were put in by oversight, and Dr. Tucker, in his paper, clearly states that most of the samples of water consisted of impure rain-water or mere tap waters. Mr. Lloyd adds that, according to private information extended to him, Dr. Tucker regards 1 part of residue in 100,000 parts as the maximum amount in good distilled water, made with glass condensers.

*Water—Detection of Nitrates.*—Alessandri and Guarsini mix the evaporated residue of the water while warm with a few drops of a solution of carbolic acid in strong hydrochloric acid, and on heating an intense red-dish-violet coloration is produced if the least trace of nitrate is present, the color changing to emerald green on addition of ammonia. The latter reaction is even more delicate than the first.—*Pharm. Jour.* Feb. 1, 1896, 83; from *Bot. Chim. Pharm.*, 1895, 490.

*Water—Sanitary Examination by Pharmacists.*—Henry W. Schimpf, observes that druggists frequently have samples of water submitted to them for analysis and opinion as to their potability, but that few of them have either the time or inclination to put a sample through a complete sanitary analysis. A complete sanitary examination of water should include a measurement of the following: 1, Color and odor; 2, total solids; 3, loss on ignition; 4, ammonia; 5, albuminoid ammonia; 6, nitrates and nitrites; 7, chlorine; 8, oxygen-consuming power; 9, phosphates; 10, hardness. It is necessary in some cases to determine the amount of the dissolved gases, as well as to make a microscopic examination of the sample. With the view to facilitating these operations in the hands of pharmacists who may desire to engage in this kind of work, the author gives concise instruc-

tions touching upon each point, for which reference may be had in Amer. Drugg., Nov. 25, 1895, 309-310.

*Drinking Water—Its Examination a Source of Revenue to the Pharmacist.*—With the view to encouraging pharmacists to engage in analytical work as an additional source of revenue as well as of reputation, F. R. Leder calls attention to the examination of drinking water as a field that has heretofore been almost exclusively occupied by professional analysts, whereas the pharmacist, at a moderate expense, can easily equip himself and carry out this as well as other simple analytical operations. The most expensive instrument required is a scale that will weigh one milligram, and next to this comes a platinum dish, though even the latter may, under circumstances, be replaced by porcelain. The author's present object is not to offer anything new or original in regard to the analysis of drinking water, but rather to call attention to the simplicity of the process usually employed and the ease with which results are obtained. In doing this, as with other chemical work, the analyst must strive to be very exact, so that with care and close attention to details the intelligent pharmacist will have no trouble in doing this class of work, and doing it accurately, thus making it not only a source of revenue, but adding materially to his reputation. The author briefly outlines the various determinations to be made, embracing color, odor, total solids, loss by ignition, chlorine, free ammonia, albuminoid ammonia, nitrites, etc., for which reference must be had to the original, in West. Drugg., April, 1896, 151-153.

*Commercial "Pure Waters"—Comparison with Chicago Hydrant Water*—D. F. Riddell has examined some waters and ice that are supplied in Chicago as being exceptionably pure by the official method of the municipal laboratory, as applied by Prof. Kennicott, and also some hydrant water from the city supply, with the results given in the following table :

100,000 parts contain :	" Neptune" Distilled Water.	" Silver" and "Twin Lakes" Ice.	" Hydrox Re-distilled" Water.	City Water.
Total Solids.....	3.5	4.4	1.8	18.4
Loss on Ignition .....	1.6	2.0	0.2	5.4
Non-volatile Mineral Matter.	1.9	2.4	1.6	13.0
Total Suspended Matter .....	.....	1.0	.....	0.7
Suspended Organic Matter ..	.....	0.1	.....	0.358
Suspended Inorganic Matter ..	.....	0.9	.....	0.342
Free Ammonia .....	0.03	0.35	0.046	0.0116
Albuminoid Ammonia .....	0.05	0.0465	0.035	0.0228
Nitrogen as Nitrates.....	0.0314	0.0314	0.0378	0.0358
Chlorides .....	0.5	0.6	0.15	0.5
Oxygen Consumed.....	0.325	1.6585	0.395	0.275
Color .....	clear, greenish	turbid, greenish.	clear, light greenish tint.	turbid, grayish.
Odor .....	slightly disagreeable.	earthy, disagreeable.	slightly disagreeable.	slightly earthy
Number of Bacteria per Cc ..	5,300	4,200	5,100	350

The city water is thus shown to be the highest of all in total solids, of which 34 per cent. are volatile. The nitrates are rather high, but as the free and albuminoid ammonia and the oxygen-consuming power are the lowest, it is beyond doubt the best water of the four samples examined. The author believes that if pharmacists and others desiring a pure water would take the city water and precipitate it by one of the old processes—either with eight or ten grains of official potassium alum to the gallon or a slight excess of neutral ferric chloride—from ten to fifteen grains per gallon—and then carefully filter, it would be found, when freshly prepared, superior to the commercial distilled water of the market.—West. Drugg., May 1896, 201-202.

*Potable Water—Determination of Organic Substances.*—Instead of establishing the titer of the permanganate solution upon oxalic acid (5 mol. oxalic to 2 mol. potassium permanganate), Alessandri proposes, as being far more simple in practice, to base the titre upon the organic substance itself. For this purpose the author prepared solutions of 0.210 gm. potassium permanganate and of 0.40 gm. oxalic acid respectively in 1000 Cc. of water. The titre of the permanganate solution is then adjusted so that 1 liter is capable of oxidizing 1 gram of organic substances (calculated as oxalic acid), and each cc. of the permanganate solution therefore corresponds to 0.001 Gm. organic substances.—Pharm. Centralh., Feb. 6, 1896, 77; from Selmi, iii, 8 to 9.

*Hydrogen Peroxide and Water—Constitution.*—A series of chemical, physical, and especially spectrometric investigations, have led J. W. Brühl to the conclusion that hydrogen peroxide must be looked upon as containing tetratomic oxygen, and that its constitutional formula is  $\text{H} \cdot \text{O} \mid \text{O} \cdot \text{H}$ . This theory is in accord with the views of H. Rose as to the compounds termed by him *quadrantoxides*, while the behavior of the compound of HCl with methylic ether, lately discussed and studied by H. Friedel, furnishes further argument in support of the tetratomicity of oxygen in the free state. In support of his theory the author refers to the electrolytic formation of hydrogen peroxide from nascent hydrogen and molecular oxygen, and its instantaneous decomposition by nascent oxygen, and further evidence is furnished by the easy decomposition of hydrogen peroxide into water and molecular oxygen. The intense reducing power of hydrogen peroxide is especially characteristic, and is probably due to the very loose attachment of the atoms of hydrogen by means of supplementary valencies. It is also probable that *ozone* has a similar constitution, while a further hypothesis is suggested by the author in the case of

*Carbonic Oxide*, the only compound in which uncombined carbon-valencies have had to be admitted hitherto. This would no longer be necessary if the tetratomicity of oxygen can be assured. The old theory of uncombined carbon-valencies is inconsistent with the spectrometric behavior of carbonic oxide, as well as with its small faculty of com-

bination with chlorine, or with other halogens. These facts are more in accord with the constitution, being  $C | O$ . The

*Constitutional Formula of Water*, in accordance with that suggested for hydrogen peroxide, would be  $H \cdot \dot{O} \cdot H$ . Water would thus be an unsaturated compound, and, in fact, no other chemical compound possesses the criteria of unsaturation in such a high degree as water. Most compounds combine easily with water and are hygroscopic; hydrates containing crystal water combinations are very numerous; and water is the most general and powerful solvent. Such a constitution of water would also agree with the high power dissociation which water exercises upon several organic compounds in separating their molecular aggregates. Alcohols, ethers, ketones, phenols, and other solvents which are capable of causing dissociation, and are analagous to water in this respect, contain oxygen; whilst hydrocarbons, etc., which have not that capacity, do not contain oxygen. Water contains the largest amount of oxygen, and its dissociation power is the highest; then follows methyl-alcohol, and the dissociative power of the higher homologues of methyl-alcohol gradually decreases.—Pharm. Journ., Feb. 1, 1896, 81–82; from *Berichte*, xxviii., 2842–2866.

*Hydrogen Dioxide—Production in a Nearly Absolute Condition*.—According to a process patented in Germany a neutral or acid solution of hydrogen dioxide may, if quite pure, be evaporated down to a strength of 50 per cent. Then, if this be further evaporated down *in vacuo* at a gradually increased temperature, a nearly pure (absolute) hydrogen dioxide comes over at about  $84^{\circ}$  to  $85^{\circ}$  C.—Amer. Drugg., May 10, 1896, 275.

*Hydrogen Peroxide—Commercial Preparation*.—Wm. Elborne has observed during the preparation of "ozonic ether," a mixture of equal volumes of methyl ether (.720), hydrogen peroxide (10 vols.), and methyl alcohol (640 p.), that a sediment appears upon standing, sometimes scanty and gelatinous, at other times voluminous and crystalline. On examination the gelatinous precipitate proved to be potassium silicofluoride, the crystalline precipitate sodium silicofluoride. He infers from this observation that hydrogen peroxide is at present prepared from potassium or sodium peroxides by decomposing with hydrofluosilicic acid, and not, as heretofore supposed, by the decomposition of barium peroxide with carbonic or sulphuric acids. The author has never found barium in the residue of samples examined by him, but as much as 3.5 per cent. of sodium silicofluoride in one sample, and the average of five other samples examined being 0.3 per cent. of potassium silicofluoride. The sample containing the abnormal quantity of sodium silicofluoride was characterized by being far more explosive (in the sense of bursting the bottle) than the others.—Chem. and Drugg., Jan. 18, 1896, 85.

*Hydrogen Peroxide—Commercial Quality*.—The U. S. Pharm. requires that solutions of peroxide of hydrogen (Aqua Hydrogenii Dioxide)

shall contain about 3 per cent. by weight, corresponding to about 10 per cent. by volume of hydrogen dioxide. Charles H. LaWall has examined twenty-five commercial samples, with results shown in the following table :

No.	Volume per cent.	No.	Volume per cent.	No.	Volume per cent.	No.	Volume per cent.
1	9.98	8	9.98	15	9.84	22	9.90
2	10.02	9	10.23	16	9.28	23	10.02
3	9.33	10	10.02	17	9.35	24	10.28
4	9.03	11	9.98	18	10.28	25	10.37
5	9.97	12	10.66	19	10.19		
6	10.07	13	10.16	20	10.07		
7	10.25	14	9.77	21	10.15		
							Average = 9.94

Proc. Pennsylvania Pharm. Assoc., 1895, 96.

*Hydrogen Peroxide.*—Value as an antidote to Poisoning by *Hydrocyanic Acid*, which see under "Cyanogen compounds."

#### NITROGEN.

*Nitrogen—Absorption by Lithium in the Cold.*—H. Delandres, while engaged in verifying the observation of Guntz that lithium prepared by his (Guntz') method absorbs nitrogen rapidly and even with incandescence at temperatures below dull redness, has made the interesting observation that lithium will absorb nitrogen readily in the cold. It is only necessary that the surface of the metal should be freshly cut and untarnished. No absorption takes place if the metal has acquired the dull-blackish tarnish, which appears to form very rapidly upon a freshly-cut surface.—Chem. News, Jan. 3, 1896, 12; from Compt. rend., Dec. 9, 1895.

*Nitrogen—Combination with the Elements of Carbon Disulphide.*—Berthelot, whilst pursuing his researches on argon (which see), has recognized the direct combination of free nitrogen with the elements of carbon disulphide. This combination takes place by the influence of electricity employed in the form of sparks or of the effluve. Carbon and sulphur are precipitated, mixed with condensed carbon subsulphides; at the same time, nitrogen is fixed on the products.—Chem. News, July 5, 1895, 11; from Compt. rend., cxx, No. 24, 1895.

*Nitrites—New Process of Preparation.*—Goldschmidt has patented a process for the preparation of nitrites, which depends upon heating a nitrate with a formate in presence of a free base. Thus  $\text{NaNO}_3 + \text{H.COONa} + \text{NaOH} = \text{NaNO}_2 + \text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$ . Inasmuch as formates are produced by the action of carbon monoxide upon free bases, the process may be modified so as to heat a mixture of nitrate and free alkali in a current of carbonic oxide.—Pharm. Centralh., Feb. 20, 1896, 106.

*Nitrites—New Reagent Solutions.*—G. Denigès recommends several new reagents for nitrites, which possess certain advantages over those in current use. The first of these reagents is prepared as needed from two separate solutions, designated as *A* and *B*. Solution *A* consists of pure white phenol, 1 Gm.; sulphuric acid, 4 Cc.; distilled water, 100 Cc. Solution *B* is prepared by mixing mercuric acetate, 5 Gm. (or oxide, 3.5 Gm.); glacial acetic acid, 20 Cc.; distilled water, 100 Cc.; shaking this mixture for a while, and adding sulphuric acid, 0.5 Cc., and filtering. In practice, 2 Cc. of each of the solutions *A* and *B*, are mixed and boiled, then one or two drops of the solution to be examined are added, when, in presence of 0.5 Gm. of nitrite per litre an immediate red or rose coloration is produced. By boiling 100 Cc. of suspected water and 10 Cc. of each of the solutions *A* and *B* for two or three minutes, it is said to be possible to detect as little as 0.2 Mgm. of nitrous acid per litre. The reagent has the advantages of being sensitive, colorless, is unaffected by light or air, or by nitrates, chlorates, hypochlorites, hypobromites, chlorine, bromine, etc.

The second new reagent is prepared by dissolving pure aniline, 2 Cc., and glacial acetic acid, 40 Cc., in sufficient water to make 100 Cc. On boiling 5 Cc. of this solution with from 1 drop to 10 Cc. of the suspected liquid, according to strength, a coloration is produced which varies from pale yellow to dark orange, according to the amount of nitrites present, and this, in its turn, is changed to red by a few drops of hydrochloric or sulphuric acid. Sodium hydrate or acetate restores the yellow (resp. orange) color, but the red color is again produced by excess of a mineral acid. As little as 0.2 Mgm. of nitrous acid per litre may be detected in water by adding 100 Cc. of the suspected water to 50 Cc. of the reagent, acidulated with sulphuric acid, and boiling for three or four minutes. The reagent is not affected by chlorates or nitrates, but is affected by hypochlorites, hypobromites, chlorine and bromine.

The third new reagent is a solution of pure white resorcin, 1 Gm., in distilled water, 100 Cc., acidified with sulphuric acid, 10 drops. If four drops of the suspected liquid are added to 2 Cc. of pure sulphuric acid, then 5 drops of the reagent added, and shaken in a test tube, an intense carmine or violet coloration is caused by the presence of 0.01 Mgm. of nitrous acid.—Pharm. Journ., Nov. 2, 1895, 365; from Journ. de Pharm. (6), ii., 289.

*Nitric Oxide—Reduction by Moist Iron or Zinc.*—The experiments of Paul Sabatier and J. B. Senderens determine that by the action of moist iron or zinc, nitric oxide is not merely reduced to nitrous oxide, but to a considerable extent to *free nitrogen*.—Chem. News, Febr. 21, 1896, 95; from Bull. Soc. Chim. de Paris, No. 16 and 17, 1895.

*Nitric Oxide—Action on Ferric Chloride.*—V. Thomas finds that when a current of dry nitric oxide is passed into a perfectly dry glass tube containing anhydrous ferric chloride, there are formed, according to the temp-

erature, two distinct compounds of nitric oxide and ferric chloride. At the same time there are disengaged abundant yellowish-brown fumes of a substance which is deposited in the colder parts of the tube, and much resembles iron oxychloride. If the temperature is much raised, the appearance of white lamellæ of ferrous chloride occurs. If these are allowed to cool in a current of the gas, they take a fine red color, absorb nitric oxide, and have a composition corresponding to the formula  $5 \text{Fe}_2\text{Cl}_4\text{NO}$ . The yellowish-brown substance has the composition  $\text{Fe}_2\text{Cl}_4\text{NO}$ .—Chem. News, Jan. 31, 1896, 59; from Bull. Soc. Chim. de Paris.

*Nitrogen Peroxide—Action upon the Haloid Salts of Tin.*—V. Thomas, after referring to the previous researches of Kullmann, Weber and Hampe, on the action of nitrogen oxides upon the haloid salts of tin, communicates the results of his study of the compounds formed by the action of nitrogen peroxide— $\text{NO}_2$ —upon the haloid salts of tin in chloroformic solution. With  $\text{SnCl}_4$  the reaction is very brisk, producing a crystalline precipitate of the composition  $\text{SnOCl}_2 \cdot \text{SnCl}_4 \cdot \text{N}_2\text{O}_5$ . It is soluble in water, hygrometric, and decomposed when heated with formation of a crystalline sublimate. The action upon  $\text{SnBr}_2$  yields a white powder, partially soluble in water with decomposition, and which on heating is decomposed into stannic acid and nitrous vapor with probably nitrogen oxybromide. With  $\text{SnI}_4$  the reaction produces a voluminous precipitate of iodine, and a white product, which when freed from iodine is not crystalline and insoluble in water, by which it is not affected.—Chem. News, Jan. 31, 1896, 58; from Compt. rend., Jan. 6, 1896.

*Aqua Regia—Toxicological Detection.*—P. Mola has established by experiments on meat mixed with aqua regia that, at common temperatures, the mixture does not evolve the slightest trace of chlorine or hydrochloric acid, but only traces of nitrous acid. Distillation is likewise useless for the detection of aqua regia in organic matter, but he finds the process proposed by Vitali for the detection of hydrochloric acid to be a good one for the detection of aqua regia. The substance is heated in a porcelain dish to  $50^\circ$ – $60^\circ$ , and gradually mixed with small portions of finely pulverized quinidine until the acid reaction has disappeared. The liquid portion containing the quinidine hydrochlorate and nitrate is filtered off, the filtrate is concentrated and mixed in a large glass tube with two-thirds of its volume of chloroform. To this mixture sufficient alcohol is added to dissolve the chloroform, which is then again set free by the addition of water. Both the quinidine salts remain dissolved in the chloroform, which are yielded upon evaporation, and give the reactions of their acid constituent when dissolved in water.—Chem. News, Jan. 17, 1896, 28; from Boll. Chim. Farm., 1895.

*Saltpetre—Discovery of Deposits in Cape Colony.*—According to "South Africa," beds of earth rich in potassium nitrate have been discovered in

the Cape Colony, and are now being worked on a practical scale. Samples have been found containing as much as 70 per cent. of nitre, but the average seems to range from 12 to 15 per cent. The extent of the deposits has not yet been determined.—Chem. News, October 11, 1895, 186.

*Sulphur Nitride—Preparation and Composition.*—R. Schenck has obtained a compound of sulphur and nitrogen, having the composition represented by the formula  $N_4S_6$ , by passing dry gaseous ammonia into a benzene solution of sulphur. The characters of the product were found to agree with the statements of previous observers, with the exception of the melting point, which was found to be  $178^\circ$  C. instead of  $160^\circ$  C.—Pharm. Journ., May 30, 1896, 421; from Annales des Chem., 290, 274.

*Calcium Sulphite—Use as a Prophylactic.*—Dr. Gelle recommends calcium sulphite as a prophylactic against influenza in doses of 0.06 Gm. per day in pill form. Three days' treatment suffices to insure immunity.—Amer. Drugg., May 10, 1896, 303.

*Fuming Sulphuric Acid—Source, etc.*—R. W. Hill states, contradictory to the information in text-books, that the so-called Nordhausen sulphuric acid is not alone not manufactured at Nordhausen, in Saxony, but never was manufactured there, but in Goslar, a couple of miles from Nordhausen. Furthermore, that at the present time it is not manufactured at all either in or near that place, but that the manufacture is practically monopolized by a large chemical concern, near Prag, Bohemia, where it is still produced in the old-fashioned manner by distilling green vitriol or ferrous sulphate. The author, after speaking of several modern methods for the production of fuming sulphuric acid, mentions the fact that fuming sulphuric acid has been produced by a German chemist from ordinary sulphuric acid by means of an electric current. Carbon plates, about  $\frac{1}{8}$ th inch apart, were immersed into sulphuric monohydrate, and an electric current passed through the fluid, by which the water of the acid was decomposed into hydrogen and oxygen, thus forming, under certain precautions, fuming sulphuric acid. It is not known, however, that the method has been tried on a commercial scale.—Chem. News, Aug. 16, 1898, 75.

*Commercial C. P. Acids—Examination.*—Prof. W. A. Puckner reports the results of a number of examinations of commercial C. P. acids that were made at different times during the past year in the chemical laboratory of the Chicago College of Pharmacy. Six samples of

*Hydrochloric Acid* were examined as to sp. gr. strength and purity. With one exception they corresponded well with the official requirements as to strength (31.9 per cent. HCl), the exception being that of an acid stronger than required, and containing 37.72 per cent. HCl. Three of them were found to be free from impurities, the others contained traces of free chlorine. Three samples of



*Nitric Acid* were examined, with less satisfactory results. The Pharmacopœia requires this acid to contain 68 per cent. of absolute acid; they contained respectively 71.93, 65.33 and 63.8 per cent., two of them being otherwise satisfactory, while one of them contained traces of hydrochloric acid, as well as a considerable amount of metallic impurities. Two samples of

*Sulphuric Acid* were examined. Both slightly exceeded the officially required strength, but were free from impurities.—West. Drugg., May, 1896, 200.

*Sulphates, Sulphites, and Thiosulphates—Detection in Presence of Each Other.*—R. Greig Smith communicates a method for the detection of sulphates, sulphites, and thiosulphates in the presence of each other, which while perhaps not altogether new, is not given completely in text-books on qualitative analysis. Preliminarily the author states that in the presence of thiosulphates dilute solutions of the substance under examination must be employed, since in the systematic treatment of the solution a decomposition of the thiosulphuric acid into sulphur and sulphuric acid is otherwise liable to take place. Barium chloride in excess is added to the solution, together with a good quantity of ammonium chloride. Hydrochloric acid is then added, drop by drop, to redissolve any precipitated barium sulphite and thiosulphate, and the barium sulphate produced is filtered off through a double filter—refiltering if the filtrate does not pass clear. A solution of iodine is then added to one-half of the filtrate until the color is permanently yellow: a white precipitate indicating the presence of sulphite, converted into sulphate. Traces may be determined by comparing the treated and untreated filtrates. The two halves are now mixed, sufficient iodine solution is added, if necessary, to produce a permanent yellow color, and the liquid is filtered. Bromine water is now added to one-half of the filtrate, when, in the presence of thiosulphate, a white precipitate of barium sulphate is produced: the iodine having converted the thiosulphate into tetrathionate, and this, in its turn, is oxidized by the bromine into sulphate. Hydrosulphuric acid, if present, must be eliminated by passing carbon dioxide through the solution before treatment.—Chem. News, July 26, 1895, 39-40.

*Nitrosulphates—Constitution.*—E. Divers and T. Haga have studied the constitution of nitrosulphates, and conclude that they are anhydro-double salts of hyponitrous and sulphuric acids, which hydrolyse into the acid salts of these acids, the acid salts simultaneously changing into normal sulphates, nitrous oxide and water. They are analogous to the thiosulphates, the hyponitrite radicle acting as sulphur does in them. Nitrosulphates are, however, true sulphates, as their reactions with alcohol and with acidified barium chloride show, their nitrogen being united to their sulphur only through an atom of oxygen— $\text{KON}_2\text{O}\cdot\text{SO}_3\text{K}$ . The authors, in a second paper, describe.

*Sodium Nitrosulphate*.—This being a very soluble salt, is obtained in crystals with some difficulty, and in a manner described. It is an anhydrous salt, forming very minute crystals, slightly alkaline to litmus, and tasting very much like common salt. It is exceedingly soluble in water, and very unstable wet or dry, decomposing rapidly, the residue of the dry salt being sulphates and sulphites. Its solutions decompose continually, but decomposition may be retarded by a little sodium hydroxide. —Chem. News, Nov. 29, 1895, 266; from Proc. Chem. Soc., Nov. 7, 1895.

*Ammonium Persulphate*— $(\text{NH}_4)_2\text{S}_2\text{O}_8$ —recommended as an antiseptic for preserving food, occurs in small colorless crystals, soluble in water. Its solution evolves oxygen.

## SULPHUR.

*Sulphur—Mining in Japan*.—According to the "Financial News" the exportation of sulphur from Japan, which in 1868 amounted to only 131 tons, has gradually increased, so that in 1890 over 21,000 tons were exported. While there was a slight drop in 1891 and 1892, in 1894 no less than 84 sulphur mines were being worked, 13 of them producing over 100 tons of sulphur each in the course of that year.—Pharm. Jour., Aug. 17, 1895, 149.

*Black Sulphur—Origin and Composition*.—Lyman F. Kebler, in the course of inquiries respecting the origin and characters of black sulphur, received several communications: One from A. E. Ebert, in which he describes it as being powdered crude sulphur or the residue of the purification of sulphur; the other from Charles A. Heinitsh, who believes it to be simply crude or native sulphur. Mr. Kebler finds Mr. Ebert's sample to be composed of 85.82 per cent. sulphur, 9.28 per cent. charcoal, and 2.90 per cent. ash, and suggests that its equivalent may be made by adding 1 p. powdered charcoal to 9 p. flowers of sulphur.—Amer. Jour. Pharm. Nov., 1895, 559, 560.

*Sulphur—Determination in Organic Substances*.—L. L. de Koninck and Ed. Nichoul determine sulphur in organic substances by a method of operation which has a general resemblance to that in the Varrentrapp and Will process for determining nitrogen. The specimen is submitted to combustion with a mixture which they call

*Nitro-Lime*, which is composed of at least 5 p. of quick lime and 1 p. of dry calcium nitrate, and is prepared as follows: The quick lime, in minute fragments quite anhydrous and free from sulphate and silicate, is placed in a porcelain capsule and gradually sprinkled with the dry calcium nitrate dissolved in one-half its weight of water, applying moderate heat to set the reaction in progress.—Chem. News, Dec. 27, 1895, 318; from Rev. Univ. de Min. et de la Metall., (3) xxxi, No. 2.

*Sulphur—Determination in Organic Compounds*.—A method which is

suitable for the determination of sulphur in organic compounds in general, and may consequently be applied to its determination in wines, urine, extracts, and the like, is the following recommended by A. v. Asbóth: 1 Gm. of the powdered substance is mixed with 10 Gm. of calcined sodium carbonate and 5 Gm. of sodium peroxide in a nickel crucible and heated by means of a small flame, so regulated that it does not touch the crucible until the mixture begins to melt. The flame is then increased and the heating continued until the melt has become thin-fluid. The proportions of sodium carbonate and sodium peroxide and the relation of their quantity to that of the substance examined are necessary to prevent the puffing of the melting mass, which is also liable to occur if the preliminary heating is too strong. The cooled mass is dissolved in water, filtered, the filtrate acidulated with hydrochloric acid containing bromine, and boiled until the odor of bromine disappears. In the solution so obtained the sulphuric acid formed can be determined directly with barium chloride. In the case of the examination of urine, wine, extracts, etc., these are evaporated to syrupy consistence with addition of 5 Gm. sodium carbonate, the remainder of the sodium carbonate (5 Gm.), and 5 Gm. of sodium peroxide being then added, and the mixture treated as in the previous case and under the same precautions.—Chem. Ztg., 1895, 2040.

*Sulphur*.—Use as a preservative for *Chloroform*, which see under "Organic Chemistry."

*Hydrogen Sulphide*.—*Ammoniacal Nitroprusside of Sodium as Reagent*.—Instead of employing lead paper for determining the presence of free hydrogen sulphide, H. Král recommends ammoniacal nitroprusside of sodium as being more sensitive, a few drops of a solution being dropped upon filter paper and this placed over the mouth of the generating vessel. In the presence of hydrogen sulphide, even if only in the faintest traces, at once develops a purple-red violet color, which is more easily recognized than the brown color developed on lead paper. The reagent is prepared by adding a few drops of strong ammonia to a watery solution of sodium nitroprusside. The presence of ammonium hydrosulphide is revealed by this reagent with equal distinctness.—Pharm. Centralh., Febr. 6, 1896, 69.

*Calcium Hydrosulphide*.—*Value and Application as a Depilatory in Surgery*.—Annequin recommends the removal of the hair preliminary to surgical operations by means of calcium hydrosulphide, as more convenient and practical than by the use of the razor. The hydrosulphide,  $\text{Ca}(\text{SH})_2$ , is prepared by saturating milk of lime with hydrogen sulphide. The hair being trimmed down as far as practicable with the scissors, the surface is covered well with the well-shaken mixture to the depth of about 2 Mm., which is allowed to remain for 8 or 10 minutes, when it has dried. By now washing it off with a thin stream of water, the hair will be found completely removed down to the roots. The depilatory is particularly recom-

mended by the author as being innocuous to the skin and the roots of the hair, the single precaution in its use being to cover abraded surfaces with a little salve. The unpleasant odor may be covered by the addition of 1 or 2 per cent. of some aromatic essence to the depilatory.—Pharm. Centralh., Jan. 2, 1896, 11; from Arch. de Méd. et de Pharm. Milit.

*Calx Sulphurata—Deficiency of Commercial Samples in Calcium Monosulphide.*—Irwin A. Becker communicates the results of some experiments to determine in how far the calx sulphurata of the market conformed to the requirement of the U. S. Pharm. of 1890. The product of the process of the Pharm. of 1880, obtained by heating together finely powdered lime and precipitated sulphur, was required to contain not less than 36 per cent. of calcium monosulphide; while the product of the Pharm. of 1890, obtained by heating dried calcium sulphate, charcoal and starch together, is required to contain at least 60 per cent. of calcium monosulphide. Five samples were obtained from parties in New York, Philadelphia and St. Louis, and, examined by the official directions, were found to more nearly approach the product of the Pharm. of 1880 than that of the Pharm. of 1890. They contained 24.85, 35.73, 41.45, 41.59, and 45.52 per cent. of the monosulphide respectively. The sample yielding 24.85 per cent. was not offered as the official substance, but merely as a crude calcium sulphide.—Amer. Journ. Pharm., Dec. 1895, 601–602.

#### CHLORINE.

*Halogens—Qualitative and Quantitative Method of Separation.*—Engel recommends for the separation of the halogens that 1.0 to 2.0 Gms. of the alkali salt be dissolved in 150 to 200 Gm. of water, 5.0 Gm. of ammonium persulphate, and some sodium acetate to be added, and the liberated iodine be shaken out with carbon disulphide. If then the residual liquid is heated to 80° and a current of air passed through it, bromine is carried over, and may be collected in a receiver. The final residue contains the chlorine, which is determined in the usual way.—Pharm. Centralh., Oct. 17, 1895, 596; from Compt. rend.

*Hydrochloric Acid—Action upon Copper.*—R. Engel observes that the decomposition of hydrochloric acid by copper with liberation of hydrogen is so slow and so inconspicuous that it has been often overlooked. He finds, however, that this acid, a solution saturated at 15° C., is decomposed by copper so rapidly that the liberation of hydrogen may be shown in a lecture experiment. If a little platinum chloride is added to the acid the reaction becomes tumultuous, but soon slackens. The decomposition becomes extremely slow when the liquid is saturated with cuprous chloride, and ceases altogether when a solution of the acid is employed having the composition  $\text{HCl} + 10\text{H}_2\text{O}$  (sp. gr. 1.083). If a current of gaseous hydrochloric acid is passed into water in presence of copper and cuprous chloride the action is very rapid. Anhydrous hydrochloric acid is always de-

composed by copper.—Chem. News, Nov. 1, 1895, 221; from Compt. rend., Oct. 14, 1895.

*Hydrochloric Acid—Industrial Recovery.*—Richard Lorenz suggests the lixiviation of certain ores with hydrochloric acid, after which the lixivium is concentrated and electrolyzed. The anodic chlorine is thus again converted into hydrochloric acid, which can be afresh used for lixiviating a proportion of the ore. He observes that very little is to be found in scientific literature concerning the conversion of chlorine into hydrochloric acid by means of elevated temperatures.—Chem. News, April 24, 1896, 198; from Zeitschr. f. Angew. Chem., 1896.

*Metallic Chlorides—Action of Nitric Oxide.*—V. Thomas has studied the action of nitric oxide upon metallic chlorides. By its action upon anhydrous ferric chloride at a very high temperature, the lower chloride is first formed, and later a reddish powder having the composition  $5\text{Fe}_2\text{Cl}_4\cdot\text{NO}$ . This is very hygroscopic, and yields pure ferrous chloride when heated in a current of inert gas. The compound  $\text{Fe}_2\text{Cl}_4\cdot\text{NO}$  was also obtained, which is decomposed by contact with moist air. The author also obtained the compounds  $\text{BiCl}_3\cdot\text{NO}$ , which is fine yellow, and  $\text{Al}_2\text{Cl}_6\cdot\text{NO}$ , which is pale yellow, by acting upon the respective chlorides. Both are hygroscopic and decomposed in presence of water, but melt in sealed tubes without decomposition.—Pharm. Journ., July 27, 1895, 74; from Compt. rend., cxxi, 128.

*Potassium Chlorate—Dangerous Prescriptions.*—Speaking of dangerous prescriptions in general, a writer in "Pharm. Wochenschr." observes that while the combination of potassium chlorate with organic bodies almost always results in explosive mixtures, such combinations are not infrequently ordered. Thus the following have been ordered for tooth powder:

1. Potassium chlorate, willow charcoal, powdered cinchona, of each 10 grammes; oil of peppermint, 6 drops.
2. Potassium chlorate, potassium bitartrate, magnesium carbonate, of each 2 p.; saccharine, 1p.
3. Potassium chlorate, sodium salicylate, each 10 p.; powdered cinchona, powdered charcoal, each 30 p.

In these formulas, and in others similar to them, the various ingredients are used partially on account of their cleansing and partially on account of their antiseptic, astringent or aromatic effect, without any thought being given to the questions of incompatibility, or liability to make the tooth powder explosive in its character. Any combination of potassium chlorate with salol, thymol, starch, sugar, saccharine, sodium benzoate, salicylic acid, sulphur, etc., such as is often ordered, is more or less prone to the production of an explosion, with danger either to the patient or dispenser.—Amer. Drugg., March 25, 1896, 181-182.

## BROMINE.

*Bromine—Crystallization.*—Henryk Arctowsky states that bromine obtained from solution in carbon disulphide by refrigeration below its point of saturation forms a heap of fine crystalline needles. When obtained by refrigerating the bromine in a test-tube, the solid substance, in comminution, showed a distinct crystalline fracture. The lustre of the crystals is not so decidedly metallic as that of iodine.—Chem. News, April 24, 1896; from Zeitschr. f. Angew. Chem., 1896.

*Hydrobromic Acid—Presence of Barium Salt in a Sample.*—R. C. Cownley calls attention to the presence of barium salt in a sample of hydrobromic acid sent to him for examination. It amounted to 4.598 grains in a pint, and while compounds of barium are not now often found in hydrobromic acid, the presence of the barium compound is a source of danger which should be guarded against.—Pharm. Journ., May 15, 1896, 385.

## IODINE.

*Iodine—Action, in the Nascent State, upon Corrosive Sublimate.*—According to the observations of Schuyten, iodine in the nascent state is capable of replacing chlorine in metallic chlorides. So, in the case of corrosive sublimate, if its ethereal solution is mixed with an equivalent of iodoform in the same solvent, and exposed to the sunlight for several days, the liquid gradually turns red, and handsome red octahedral crystals of mercuric iodide ( $\text{HgI}_2$ ) are deposited in nearly quantitative proportions. Free iodine under the same conditions does not produce this reaction.—Pharm. Centralh., Jan. 25, 1896, 49; from Chem. Ztg., 1895, 1683.

*Iodides—Determination in Presence of Chlorides as Thallous Iodide.*—T. Jannasch and K. Aschoff propose a method for the determination of iodides in presence of chlorides, which is founded on the absolute insolubility of thallous iodide and the solubility of thallous chloride in solutions of ammonium sulphate and alcohol. About 0.5 Gm. of a mixture of sodium chloride and potassium iodide is dissolved in 40 to 50 Cc. of water, mixed with 50 Cc. of a 20 per cent. solution of ammonium sulphate and 30 Cc. of alcohol, and a 4 per cent. solution of thallium sulphate is added until a precipitate ceases to be formed. The yellow thallium iodide quickly settles on the application of a gentle heat. After standing for twelve hours in the cold, the precipitate, with the aid of a suction-pump, is collected on a weighed filter, and is twice washed with a mixture of 5 parts of ammonium sulphate, 70 parts of water, and 30 parts of alcohol, and finally with alcohol of 30 to 50 per cent. The filter, with its contents, is dried at  $100^\circ$  and weighed. The chlorine is determined in the filtrates and washings in the well known manner as silver chloride.—Chem. News, June 12, 1896, 281; from Zeitsch. Anal. Chem., xxxiv, Part 6.

*Iodine—Sodium Chloride as a Solvent.*—The use of sodium chloride as

an aid to the solution of iodine in water is recommended by Muller, more particularly if the solution is intended for internal use. The following, for instance, is a suitable prescription: Tincture of iodine (10 per cent.), 1 to 2 Gm.; sodium chloride, 2 Gm.; distilled water, 200 Gm.—Pharm. Journ., June 27, 1896, 505; from *Méd. Nouv.*

*Iodine—Efficient Combination with Tannin and Gallic Acid.*—See *Iodotannin syrups* under "Pharmacy."

*Potassium Iodide—Liability of the Solutions of the Pure Salt to Acquire Color.*—Wm. Elborne calls attention to the liability of some concentrated solutions of potassium iodide to become colored in a very short time, while others remain colorless for an indefinite period. He attributes this difference to the kind of commercial salt used, that occurring in semi-transparent crystals neutral to test paper (and apparently the purer salt) rapidly developing free iodine, and that occurring in white, opaque crystals, which contain a little free alkali (generally potassium carbonate), is apparently not changed. It is evident that the change in the pure (neutral) salt is produced under the influence of light, since solutions of this variety also remain colorless if kept in the dark; but he considers it advisable to permit a slight alkalinity, say about 0.3 per cent. of potassium carbonate, in the official salt, since it cannot, in that proportion, detract from its medicinal value, and insures a stable aqueous solution under all conditions. Similarly, the author has observed that

*Ammonium Iodide* turns yellow on keeping, in this case the salt itself, by the loss of ammonia. To prevent this it is customary to keep a lump of ammonium carbonate suspended in the container. It occurred to him that the addition of about 0.3 per cent. of potassium carbonate might be of service here, and a sample of ammonium iodide so treated is found to be perfectly white. He is not prepared to say, however, that this treatment will effectually prevent subsequent change.—Chem. and Drugg., Jan. 18, 1896, 85.

*Potassium Iodide—Commercial Quality.*—Lyman F. Kebler observes that there exists very little iodide of potassium in the channels of trade that complies strictly with the U. S. P. requirements. Not only is this true of the commercial product, but some of the so-called chemically pure material is also found wanting. Some of the best manufacturers maintain that the official requirements are too rigid for a medicinal product, an opinion in which the author concurs; but the chemically pure substance ought to comply with these requirements. Of twelve samples of commercial potassium iodide examined by the author, five contained alkalies in excess, nine contained sulphates, three contained iodates, and five contained sodium, while one contained a trace of free iodine.

The author incidentally calls attention to an inconsistency in the requirements of the U. S. P. A limited amount of alkali is admissible, and

this being present as carbonate, a reaction is obtained by barium chloride which will lead to the inference that sulphates are present. The test for the absence of sulphates should therefore be modified, as follows: "The aqueous solution *acidulated with hydrochloric acid* should remain clear after addition of barium chloride T. S., etc."—Amer. Jour. Pharm., April, 1896, 196–197.

*Potassium Iodide—Detection of Impurities.*—The following simple method for the detection of impurities in potassium iodide is recommended in "Revue Pharm. des Flandres:" Dissolve 1 Gm. potassium iodide and 1 Gm. lead acetate, each separately, in 50 Cc. absolute alcohol, and mix the two solutions. If the potassium iodide is pure the lead iodide formed will separate in the form of a golden-yellow precipitate, the potassium acetate formed remaining in solution; but if chlorides, bromides, iodates or sulphates, are present as impurities, their lead compounds being white, these form a distinct and sharply defined white zone which is easily recognized.—Pharm. Centralh., Aug. 22, 1895, 474.

*Iodates—Various Inorganic Salts.*—E. Merck describes a number of iodates, inorganic and alkaloidal. The latter will be mentioned under "Organic Bases;" the inorganic here, as follows:

*Iodate of Lithium.*—A white powder, very soluble in water.

*Iodate of Mercury.*—A white, amorphous powder, nearly insoluble in pure water, but soluble in water containing potassium iodide or sodium chloride.

*Iodate of Silver.*—A white salt, with difficulty soluble in boiling water. It is used with good results as a powerful astringent for intestinal trouble, given in doses of 0.005 to 0.01 Gm. in form of pills made with bolus alba.—Pharm. Centralh., Febr. 13, 1896; from Merck's Report for 1895.

*Iodates—Physiological Advantages.*—Ruhemann has shown that sodium iodate, when brought in contact with the mucous membrane, eliminates iodine, and he has recommended it as preferable to the organic iodine compounds commonly used. He has recently extended his observations to other iodates, especially those of silver, lithium, mercury, and some of the alkaloids. Subcutaneous injections of 1.5 grains of the lithium salt has been found very efficacious in cases where there was copious elimination of uric acid, and somewhat larger doses given internally have been useful in chronic gout. Scopolamine iodate is said to be three times as active as the other salts, and it, as well as atropine iodate, produces mydriasis more rapidly than the other salts of these bases. The solutions of atropine iodate can be kept for a long time unaltered without addition of an antiseptic.—Pharm. Journ., Feb. 29, 1896, 162; from Merck's Jahresbericht, p. 33.

*Periodides—Review and Classification.*—Prof. Albert B. Prescott observes that the periodides are remarkable as products of extreme additive combination, along with clearly-cut crystalline forms, distinct constants,



and instances of rare optical power. They are easily reduced to normal iodides, containing for every atom of iodine firmly bound, one or more iodine atoms loosely bound; therefore they are often and not improperly termed superiodides—so by Jörgensen, while Genther used for them the term polyiodides, perhaps by reason of his views that all their iodine atoms are of equal value in the molecule. If these compounds contain, as their behavior has been interpreted to imply, for every atom of iodine that is linked to the base a number of atoms of iodine linked only to iodine, they offer a striking example of the influence of a basal group upon iodine atoms to which it is not linked. The one iodine atom that is directly united to the nitrogen or other base-forming element, by virtue of this union, enables a number of other iodine atoms (say from two to eight) to unite with each other together with itself into an iodine group, capable of forming multiples of polybasal molecules. To obtain a general survey of the principal known periodides, they may be provisionally classified, chiefly with respect to their bases, as follows:

1. The periodides of potassium and mercury. Any double metallic polyiodides containing additive iodine and without other acid.
2. Periodides of ammonium, periodides of arsonium and of stibonium, if they have been obtained. The same metallic derivatives of arsonium and stibonium, if they have been obtained.
3. The periodides of organic bases. They are mostly of the quaternary and the tertiary bases, of the nitrogen-base family, including bases with oxygen and without it, etc., etc.
4. The periodide of iodonium, the organic iodine base obtained by Victor Meyer in 1894.
5. Aromatic sulphur periodides, as found by Kastle and Hill in 1894.
6. Acid polyiodides, more or less complex, and double-base periodides, inorganic and organic, including those in which the iodine is not in additive combination, that is, *not* yielding a distinct part of the iodine to reducing agents with a good end reaction.

The author reviews the various studies, hypotheses, and observations, that have been made concerning these interesting bodies, beginning with the biniodide of ammonium of Berzelius, which was probably the first periodide recognized, but reviewing particularly the studies of Jörgensen and of Genther, who appear to have contributed more than any other authorities towards clearing up the nature of these iodine compounds.—*Journ. Amer. Chem. Soc.*, xvii, No. 10, October 1895; from Reprint.

#### FLUORINE.

*Hydrofluoric Acid—Action upon Crystallized Silicon.*—G. S. Newth observes that it is generally stated that hydrofluoric acid is without action upon crystallized silicon, while the amorphous element is attacked by it. This statement, however, requires to be made with some reservation, for

although it is doubtless true of the aqueous acid, and possibly of the liquid acid, it is not true of the gas. If acid potassium fluoride be heated in a platinum retort, and the pure gaseous hydrofluoric acid so produced be allowed whilst hot to blow upon a little heap of crystallized silicon supported on a porcelain crucible lid, the silicon at once takes fire and burns brilliantly in the gas, forming silicon fluoride and hydrogen. If the neck of the retort be more than an inch or two in length, it is necessary to heat it in order to keep the gas sufficiently hot. The importance of this observation lies in the fact that the spontaneous ignition of crystallized silicon is generally regarded as in all cases a sufficient test for *free fluorine*; but it is evident that unless the temperature of the gas is below a certain point the combustion of silicon is not a safe criterion.—Chem. News, Dec. 6, 1895, 278; from Proc. Chem. Soc., Nov. 7, 1895.

## PHOSPHORUS.

*Phosphorus—Revival of Copper Salts as Antidote.*—The unsatisfactory experience with permanganate of potassium as an antidote to poisoning by phosphorus, recently recorded by Lanz, lends additional importance to the experiments by Szöcs with copper salts for the same purpose. The disuse into which the latter have fallen is ascribed by Szöcs to the excessive doses employed, whereby they produced emesis, but failed to exert their true antidotal effect, which consists in converting phosphorus partially into orthophosphoric acid. On the ground of successful experiments upon animals, he recommends the administration of 0.1 to 0.5 per cent. warmed solutions of cupric sulphate, in quantities of 2 to 3 liters for washing out the stomach, or 1 to 1.5 liters to be drunk, emesis being induced mechanically, if necessary.—Pharm. Centralh., Jan. 9, 1896, 23; from Med. Chir., Buda-Pesth, 1895.

*Phosphorus—Criticisms and Suggestions on Various Pharmaceutical Preparations.*—W. Martindale contributes a paper on the "Pharmacy of Phosphorus" in which he reviews and criticises the different pharmaceutical preparations of that substance—such as phosphorated oil, phosphorated ether, simple and compound spirit of phosphorus, pills, etc.—calling attention to objectionable features pertaining to their characters or formulas, and makes some suggestions with a view to remedying them. The author's observations respecting the more important preparations are given in abstract under the titles of the preparations concerned.—Pharm. Jour., March 14, 1896, 201–203.

*Phosphorus—Precautionary Measures to Prevent Necrosis.*—In order to prevent the injurious action produced by phosphorus upon persons engaged in the manufacture of matches, the Austrian Government Inspectors direct the addition of 5 per cent. turpentine to the phosphorus-mass, which, it is said, prevents the volatilization of white phosphorus completely.—Pharm. Centralh., Dec. 19, 1895, 728.

*Phosphorus and Its Compounds—Introduction into Pharmacy.*—The "Pharmaceutical Journal" (Nov. 23, 1895, 433-434,) gives an interesting account of the introduction of phosphorus and its compounds into pharmacy, discussing their various uses and applications in historical and chronological order. The paper is of a character that does not admit of profitable condensation, and reference must here be confined to the simple citation of the compounds that are discussed, viz., *phosphorus, zinc phosphide, ammonium phosphide, phosphoric acid.*

In a second paper (Ibid., Dec. 21, 1895, 513, 514) the compounds and preparations of phosphoric and hypophosphorous acid are very fully brought to notice, viz., the phosphates, pyrophosphates and hypophosphites of calcium, iron, sodium, ammonium, potassium, and of the alkalis, etc.

*Hypophosphites—Examination of Commercial Samples.*—In connection with his investigations respecting the source of the sulphuretted odor sometimes observed in samples of Syr. Hypoph. Co. B. P. C. (which see under "Pharmacy,") W. A. H. Naylor communicates the results of his examination of commercial samples of hypophosphites in tabular form, as follows :

Sample.	No.	Sulphates.	Sulphites.	Phosphates.	Phosphites.	Chlorides.	Calcium.
Potassium Hypophosphite.	1	traces.	absent.	absent.	present.	absent.	traces.
" "	2	"	"	"	"	"	"
" "	3	"	"	"	"	traces.	"
" "	4	"	"	"	"	absent.	"
" "	5	"	present.	"	very small quantity.	traces.	"
Sodium Hypophosphite....	1	fair qty.	absent.	"	present.	"	present.
" "	2	traces.	present.	"	"	"	"
" "	3	"	"	"	"	"	traces.
" "	4	fair qty.	absent.	"	"	absent.	"
" "	5	traces.	present.	"	"	present.	"
Calcium Hypophosphite ..	1	fair qty.	absent.	present.	mere trace.	absent.	—
" "	2	traces	"	traces.	absent.	"	—
" "	3	"	"	present.	very small quantity.	"	—
" "	4	"	"	"	"	"	—
" "	5	"	"	"	absent.	"	—
Manganese Hypophosphite	1	fair qty.	"	absent.	present.	present.	absent.
Barium Hypophosphite ...	1	traces.	"	"	"	"	"
Hypophosph. Acid.....	1	"	"	"	0.232 % $H_3PO_3$	traces.	fair quantity.

—Pharm. Jour., Aug. 17, 1895, 144 ; from Proc. Brit. Phar. Conf., 1895.

*Calcium Hypophosphite—Examination of Commercial Samples.*—Six samples of calcium hypophosphite were examined by M. A. Faris, a student of the Chicago College of Pharmacy, and Prof. W. A. Puckner reports the results. They all formed neutral solutions in water, 1.20, and three of them were completely soluble, the other leaving slight residues. Slight traces of soluble phosphates were present in one sample ; the others all gave decided evidence. Soluble sulphate was present in large quantity only in one sample, and was entirely absent in two. Titration with decinormal potassium permanganate revealed the presence of the following

percentage of pure salt in the samples: 97.4, 96.6, 99.4, 97.5, 98.6 and 95.2 per cent.—West. Drugg., May, 1896, 200.

*Phosphoric Acid—Simplified Method of Determination.*—J. Hanmann determines phosphoric acid by directly weighing the precipitate of ammonium phosphomolybdate obtained by vigorous agitation for half an hour *in the cold* of the phosphoric acid solution with a molybdenum solution prepared as follows: To 100 Gm. molybdic acid add 1 litre of 10 per cent. ammonium solution and  $1\frac{1}{2}$  litre of nitric acid, sp. gr. 1.246. The precipitate obtained by means of this solution is washed with an acidified solution of ammonium nitrate, dried, and gently ignited. It assumes a pure black-blue color, and has a constant composition, 100 p. containing 4.018 p. of phosphoric acid.—Chem. News, Jan. 31, 1896, 53; from Chem. Ztg.

*Phosphoric Anhydride and Metaphosphoric Acid—Molecular Weight and Formula.*—The formula  $P_2O_4$  has been assigned by Thorpe and Tutton to the compound they designate as "phosphorus tetroxide;" but no determination of the vapor density having been attempted, it remains uncertain whether this formula really expresses the molecular weight. H. A. Tilden and R. E. Barnett have now made a series of determinations of the density of the vapor of "phosphoric anhydride" at a bright red heat with results which point to the formula  $P_4O_{10}$  instead of the simple expression  $P_2O_5$ , which has hitherto been always accepted, chiefly on the ground of its analogy with the pentasulphide; but the authors are of the opinion that the low vapor density observed by V. and C. Meyer in the case of the phosphoric sulphide is due to dissociation of that compound on vaporization into phosphorus sulphide and sulphur. Tilden and Barnett have also made determinations of the density of the vapor of "metaphosphoric acid," from which they draw the conclusion that this compound is partly dissociated by heat into water and the anhydride, and that the acid must be represented by the molecular formula  $H_2P_2O_6$ .—Chem. News, Feb. 28, 1896, 103.

*Tri-Phosphoric Acid—A New Compound.*—Fleitmann and Hinneky insert between pyrophosphoric and metaphosphoric acids, two new compounds, *tetra-* and *tri-phosphoric acids*. Fritz Schwarz has experimented with triphosphoric acid,  $H_3P_3O_{10}$ , and has prepared the salts of cobalt, nickel, copper, barium, calcium, and zinc, but an attempt to prepare the lead salt resulted in the production of the tetraphosphate.—Chem. News, Jan. 24, 1896, 48; from Zeit. f. Analyt. Chem., ix, 4.

*Phosphates—American Output in 1895.*—Samuel Peacock communicated a paper to the American Chemical Society at its meeting, Jan. 20, 1896, which dealt chiefly with the commercial aspect of the phosphate industry. He says that South Carolina is the largest producer of phosphate, Florida standing next, and Tennessee last; that the total output for 1895 was less

than in 1894, so far as statistics have been obtainable, but that in Tennessee the output was very much greater than in the previous year, being about 50,000 tons as against 15,000 tons in 1894.—*Amer. Drugg.*, Jan. 25, 1896, 43.

*Insoluble Phosphates—Method of Rapid Estimation.*—Vincent Edwards observes that while there can be no doubt that the estimation of both "soluble" and "insoluble" phosphates in manures is best effected by weight, the volumetric method by means of uranium acetate is extremely useful when the results are required without delay; and, though the results may be a trifle low, with care they will be found very near those by weight. About 0.5 Gm. of the sample is exhausted with cold and hot water, the undissolved matter is collected and washed on a small Swedish filter, from which it is transferred to a small beaker by washing off with hot water, and boiled for a short time with very little hydrochloric acid on a sand bath. The hot solution is then run into a larger beaker through the same filter, the residue and filter washed, and the filtrate diluted to 300 Cc. Ammonia is added to alkalinity and then acetic acid till just acid, the smaller the amounts of these used the better. The beaker is then heated till warm, a few drops of uranium acetate are run in, and the heating continued till the usual precipitate appears; the titration is then carefully finished, a deep color being taken on the end-mark. The dilution greatly increases the accuracy of the method, and it is possible that a weaker solution of uranium might also be used with advantage for the "insolubles" than the ordinary one (1 Cc. = 0.01 Gm.  $\text{Ca}_3\text{P}_2\text{O}_8$ ).—*Chem. News*, Jan. 17, 1896, 25.

*Soluble Phosphates—Volumetric Determination in Superphosphates.*—C. Glaser describes a volumetric process for the determination of the phosphoric acid soluble in water in superphosphates, which is founded on the same basis as the method of Emmerling: Two Gm. superphosphate are repeatedly stirred up with much water, and after repeated decantation washed on the filter until 250 Cc. of filtrate are obtained: 50 Cc. of the filtrate, after the addition of 2 drops of methyl-orange solution, are titrated with decinormal soda until the acid reaction has *completely* disappeared—a point not quite easy to reach. Neutral solution of calcium chloride is then added, when, in presence of iron and aluminum, there occurs a slight return to an acid reaction. Then 5 drops of solution of phenolphthalein are added, and the liquid is titrated with quick rotation in a tall beaker, with decinormal soda until an alkaline reaction is *just perceptible throughout the entire liquid*. This is the correct terminal point and is noted as such, but must be confirmed by the addition of a few Cc. more of soda solution in excess so as to make the alkaline reaction—which otherwise disappears—permanent. Each Cc. of decinormal soda corresponds in the first part of the titration (methyl-orange) to 7.1 Mgm. phosphoric anhydride, and in the second (phenolphthalein) to 3.55 Mgm. The

chief condition for obtaining accurate results is the addition of an excess of perfectly neutral calcium chloride, after the solution has been adjusted to neutrality with methyl-orange.—Chem. News, May 8, 1896, 212-213; from Zeit. Anal. Chem., xxxiv., 768.

*Sodium Phosphate—Solution by the Addition of Certain Solids.*—Commenting upon an inquiry respecting a solution containing 85 grains of sodium phosphate in a teaspoonful, John M. Tobin states that such a solution may be obtained by mixing together, in a warm or hot mortar, 5 p. sodium nitrite, crystals, 13 p. citric acid, crystals, triturating until liquid, adding 85 p. granular sodium phosphate, triturating until semi-liquid, transferring to a bottle, and keeping this in a warm place, with occasional agitation, until dissolved. Then filter.—Pharm. Era. April 9, 1896, 453.

The editor of the "Amer. Journ. Pharm." (May 1896, 257) in a footnote to Mr. Wescott's paper on *Solution of Citro-Phosphates of Sodium* (see *Liquores* under "Pharmacy"), remarks that an error has evidently crept into Mr. Tobin's formula requiring sodium "nitrite," since, in his experience, citric acid will actively decompose sodium nitrite with evolution of red fumes, and he thinks that sodium "nitrate" is undoubtedly intended.

*Thiophosphites—A New Series of Compounds.*—Ferrand has obtained a new series of compounds, corresponding to the general formula  $PS_3M_3$ , by heating mixtures of sulphur, red phosphorus, and different metals. Thiophosphites have thus been prepared of copper, iron, silver, nickel, chromium, zinc, cadmium, mercury, and aluminum. — Pharm. Journ., March 1896, 241; from Compt. rend., cxxii, 621.

*Thiopyrophosphates—A New Series of Compounds.*—Ferrand, supplementary to the thiophosphites previously described, now describes another series of compounds corresponding to the formula  $M_4P_2S_7$ .

*Copper Thiopyrophosphate*,  $Cu_4P_2S_7$ , occurs in violet crystals, which are red by transmitted light.

*Iron Thiopyrophosphate*,  $Fe_4P_2S_7$ , occurs in small crystalline lamellae.

*Silver Thiopyrophosphates*,  $Ag_4P_2S_7$ , forms a yellow crystalline mass.

*Nickel Thiopyrophosphate*,  $Ni_4P_2S_7$ , is a dark brown crystalline powder.

*Chromium Thiopyrophosphate*,  $Cr_4P_2S_7$ , is a black crystalline powder.

*Zinc Thiopyrophosphate*,  $Zn_4P_2S_7$ , is in form of small needles.

*Cadmium Thiopyrophosphate*,  $Cd_4P_2S_7$ , is a white crystalline powder.

*Mercury Thiopyrophosphate*,  $Hg_4P_2S_7$ , occurs as a red crystalline powder.

*Lead Thiopyrophosphate*,  $Pb_4P_2S_7$ , also forms a reddish crystalline powder, and

*Aluminum Thiopyrophosphate*,  $Al_4P_2S_7$ , a mass of small white needles.

The nickel, chromium, zinc, mercury, and aluminum salts decompose readily in moist air or water, alkalies also attack some of the compounds, acids practically all of them.—Pharm. Journ., May 30, 1896, 421; from Compt. rend., cxxii. 886.

## BORON.

*Boron—Compounds with Nickel and Cobalt.*—H. Moissan describes two new metallic borides, obtained (by the aid of the electric furnace? Rep.) at a temperature of  $1200^{\circ}\text{C}$ .

*Nickel Boride*,  $\text{NiBo}$ , occurs in brilliant prisms, several millimeters long, and is very electric. It has a density of 7.39.

*Cobalt Boride*,  $\text{CoBo}$ , has a density of 7.25, but in other respects the characters described as pertaining to the nickel compound. The properties of the two borides are analogous also to those of "iron boride," heretofore described, and the compounds serve for the introduction of boron into a metal, such as iron, at a high temperature.—Pharm. Jour., Mar. 28, 1896, 241; from Compt. rend., cxxii., 424.

*Boric Acid—Prevalence in Nature.*—H. Jay, as the result of comprehensive experiment, concludes that boric acid is distributed over the chief part of the globe, if not over the whole; both wild and cultivated plants absorb it from the soil and water whenever they meet with it; and most important of all, the acid is not assimilated when introduced into the animal stomach in small quantities, but is eliminated with the urine and other excretions. He has found it in the ash of fruits to the extent of 1.5 to 6.4 Gm. per kilo; in the ash of seaweed, plane-tree leaves, wormwood tops, chrysanthemum flowers, onions, etc. The cereals, and certain fungi, seem to absorb it with least facility. It is not found in the milk and blood of animals, but in the urine it is found to the extent of 0.0086 Gm. per litre in that of the cow, and 0.0075 Gm. per litre in that of the horse.—Pharm. Jour., Feb. 29, 1896, 164; from Compt. rend., cxxi., 896.

*Boric Acid—Detection by Means of an Apparatus of Novel Construction.*—W. M. Doherty recommends the following method for the detection of boric acid in milk, wine, etc: The liquid or substance is made alkaline with sodium carbonate, dried, and thoroughly charred, but not burned to ash. The charred mass is extracted with boiling water, the solution obtained is made acid with hydrochloric acid, and evaporated gently over the water-bath in a small porcelain boat, which is placed in an apparatus of the following description: A piece of glass tubing, about 9 inches long and  $\frac{1}{2}$  inch in diameter, is turned over at right angles at one end and drawn to a fine aperture. A second piece of tubing about  $2\frac{1}{2}$  inches long and  $\frac{1}{4}$  inch bore is provided with a hole in the side, and placed over the aperture so as to form a glass Bunsen burner. The porcelain boat containing the prepared substance supposed to contain boric acid is placed in the longer tube, which is attached at the wide end to the gas supply, the whole being supported by a clamp. The gas is regulated so as to produce a clear flame about  $\frac{1}{2}$  inch long, and free from luminosity at the extremity of the upright tube. The vicinity of the porcelain boat is heated by an ordinary Bunsen burner, and if boric acid is

present, even in the most minute quantity, the flame will show it distinctly. It is advised to apply the heat gently, increasing slowly and carefully, observing the flame in the meanwhile.—Chem. News, May 15, 1896, 230.

*Borax—Industrial Production in America.*—A writer in "Amer. Drugg." (Jan. 10, 1896, 4-5), after giving an historical account of the borax industry in America, gives some information respecting its manufacture. The three forms in which borax has been most plentifully found, are *tincal*, or crude crystalline borax; *ulexite*, or calcium borate, commonly known in the borax region as "cotton balls;" and *crude borax*, or sodium borate in a granular condition, such as is found in Teel's Marsh. The calcium borate found in the borax mines of the Calico Mountains differs in some characteristics from that existing in the "cotton balls," and is known as "Colemanite." Altogether, some twenty-two natural borates have been found, but those mentioned are the principal forms.

At Alameda, where extensive borax factories are located, Colemanite (calcium borate) is fed into a breaker, whence it goes into a mill and is ground up into a very fine smooth powder. At the same time sodium carbonate, obtained by solar evaporation from Owen's Lake, Inyo County, Cal., is also powdered, and the two salts are dropped into iron boilers filled with water heated by steam coils and provided with stirrers. By double decomposition solution of sodium borate is formed and calcium carbonate is precipitated. The solution is run off into the crystallizing tanks, the residual calcium carbonate being thoroughly washed to remove all the borax adhering to it. The impure borax obtained by the first crystallization requires recrystallization, which is effected in large vats, 5 to 6 feet in cubical capacity, stout wires being suspended in these vats in such manner that the borax may crystallize on them out of the hot solution. The product collecting on these wires is considered pure, and is placed on the market in crystals as "refined" borax, or pulverized as "powdered refined" borax. The mother liquors from the original crystallization are run back into the boilers and utilized in the further decomposition of calcium borate and sodium carbonate. The borax crystallizing in the bottom of the vats is somewhat impure and finds various uses in the arts, but is not sold as "refined." The manufacture of borax from "cotton balls" is essentially the same as that from "Colemanite." That from crude granular sodium borate is essentially a process of recrystallization, the first crystals obtained requiring, however, recrystallization to render them pure.

The uses of borax are constantly increasing. Its old uses in blacksmithing, and its use in medicine, are comparatively insignificant. Its largest use now is as a meat preservative, while its use as a cleansing agent is constantly increasing and largely responsible for its consumption. The world's output for 1892 is computed to have been 23,000 tons and is annually increasing; the Pacific Coast output having increased from 2,500 tons in 1875 to 6,700 tons in 1895.



*Basic Aluminum Borate—Preparation, etc.*—It has been stated that the precipitate produced when solutions of alum and borax are mixed is aluminum hydroxide. J. Martensen's experiments contradict this. He finds that when the precipitate is washed until the washings no longer give the reaction from sulphuric acid, the precipitate after heating it to redness contains from 25.42 to 25.827 per cent. of boric acid, which corresponds to the formula of Rose,  $2\text{Al}_2\text{O}_3 + \text{B}_2\text{O}_3 (+5\text{H}_2\text{O})$ . By continuing the washing the precipitate loses some boric acid, but it is not possible to remove all of it.—Pharm. Centralh., April 23, 1896, 253; from Oesterr. Zeitschr. f. Pharm., 1896.

#### SILICON.

*Silicon—Compounds with Nickel and Cobalt.*—Moissan has recently shown the action of silicon upon iron, chromium and silver. Vigouroux now describes nickel and cobalt silicides obtained in a similar manner. These silicides have a distinctly metallic aspect, a steel-gray color, and are perfectly crystalline.

*Nickel Silicide* has a specific gravity of 7.2 at  $17^\circ$ , and

*Cobalt Silicide* has a specific gravity of 7.1 at the same temperature. They are more easily fusible than silicon or than the pure metals, but they resist the highest temperatures without decomposition. Fluorine attacks them with incandescence at the ordinary temperature. In dry chlorine they burn with incandescence at a red heat. The composition of the nickel compound is  $\text{SiNi}_2$ , and that of the cobalt silicide is analogous.—Chem. News, Dec. 6, 1895, 281; from Compt. rend., Nov. 11, 1895.

*Crystallized Silicon.*—Action of *Hydrofluoric Acid*, which see under "Fluorine."

*Copper Silicide—Preparation and Characters.*—Vigouroux has prepared a copper silicide,  $\text{SiCu}_2$ , by heating silicon and copper together in an electric furnace. The silicide is a very hard and brittle substance, of s. g. 6.9 at  $18^\circ \text{C}$ . The halogens attack it with incandescence; fluorine at the ordinary temperature, chlorine before it reaches a red heat, and the others at higher temperatures. At a red heat dry oxygen or air converts it into a silicate, and moist air oxidizes it in the cold. Hydracids also attack it, forming silica and salts of copper; potash in solution blackens it, and alkaline carbonates in a state of fusion decompose it if finely powdered. It reduces the vapor of water.—Pharm. Journ., Febr. 29, 1896, 161; from Compt. rend., cxxii, 318.

*Silica—Reduction by Charcoal.*—Henri Moissan has obtained a very decided reduction by heating a mixture of rock-crystal and carbon in powder in a cylinder of coke closed at one end. If the temperature is not very high a part of the silicon escapes the action of the carbon, and is found in the state of crystals or of fused globules. This procedure may be applied to the preparation of silicon by refrigerating its vapor at the

moment of production.—Chem. News, July 26, 1895, 49; from Compt. rend., No. 25, 1895.

*Silica—Solubility in Rain and Spring Water.*—Arthur M. Edwards, while engaged in examining the soundings brought home by the U. S. S. Tuscarora and made during the season of 1873 and 1874, has made the observation that silica, in so far as it is represented by the shells of *Bacillariaceæ*, *Spongida*, and *Rodiolarie* which are present in the infusorial earths and soundings, is soluble in rain-water and also in filtered spring water. In the three states in which silica is known to exist—as quartz, in the form tridymite and in the amorphous form—it is insoluble in water and in all acids except hydrofluoric, but it is easily soluble in all alkalies, to the presence of which (ammonia in rain-water) we must probably look for the solvent effect of rain and spring water observed by the author. It must be remembered, however, that the shells of the *Bacillariaceæ* are not always composed of silica, though most commonly they are composed of the amorphous variety.—Chem. News, Jan. 10, 1896, 13.

*Silicates—Reduction with Lead Carbonate*—The reduction of silicates is accomplished, according to Jannash, by mixing them with pure lead carbonate and melting the mixture in platinum. The melt is removed by placing the hot crucible in cold water, and is then treated with nitric acid. Evaporation (resolution in water and filtration? Rep.) removes the silica; the lead is removed from the filtrate first as chloride and finally by hydrogen sulphide.—Pharm. Centralh., Oct. 10, 1895, 584; from Pharm. Rundschau.

*Soda Glass—Remarkable Change in the Structure by Heating.*—E. Priwoznik observes that among the thin-sided tubes of soda-glass produced for chemical purposes, there are occasionally some which on heating undergo a strange modification of structure. At the temperature of boiling water the upper layer displays both within and without a vast number of fine cracks running in all directions. These cracks do not penetrate deeply into the glass, so that when the scales are rubbed off the body of the tube has not lost much in thickness.—Chem. News, Jan. 24, 1896, 48; from Zeitschr. f. Analyt. Chem., ix, 4.

*Glass—Expansion, Etc.*—In a report presented by Dr. Schott to the "Société d'Encouragement pour l'Industrie," some interesting information is given respecting the expansion of glass and the methods of soldering glasses. He states that for silicious glasses the expansion increases with the proportion of alkali. Boric acid produces a striking decrease of expansion. In superimposing upon each other two glasses of different compositions, it is requisite that there should exist a certain relation between the relative thickness of the two layers of glass and their coefficients of expansion. Thus at Jena they solder normal thermometer glass, the coefficient of cubic expansion of which between 0° and 100° is 0.000244, to

an aluminous sodium borosilicate, the expansion of which is 0.0000177. The former kind of glass must be placed externally and the second internally in order to form a hollow vessel or a tube. It is practicable also to join together three or more layers of two or more glasses. Of two layers of glass with different expansions, after cooling, that with the greatest expansion will be in a state of tension, and the other in a state of compression. External layers in a state of compression increase in a striking manner the resistance of glass to mechanical actions and to rapid changes of temperature. Flasks thus manufactured may be heated to  $184^{\circ}$ , and may then be sprinkled with cold water without injury. Moreover, such glasses are not liable to the sudden rupture presented by glass tempered by the process of de la Bastie.—Chem. News, Nov. 29, 1895, 269–270.

*Glass—Effect of Alumina in its Composition.*—Leon Apport states that the introduction of alumina into glasses prevents, or at least retards, denitrification produced by slow and repeated reductions of temperature. The presence of alumina in a glass enables the substitution without inconvenience, and even with advantage, for a part of the alkaline base its equivalent of lime. The use of alumina—which may be best introduced in the state of feldspar—may be extended to window glass and to drinking glasses.—Chem. News, April 10, 1896, 175; from Compt. rend., Mar. 16, 1896.

#### CARBON.

*Black Diamond—A Large Specimen.*—Henri Moissan describes a black carbon that has recently been found in the region between the Rio à Rancador and the Brook das Bicas, Brazil, which, weighing 630 grams = 3073 carats, is the largest specimen that has hitherto been found. It is of a rounded form, distinctly black; has under the microscope the appearance of a substance from which gases have escaped whilst in a pasty state; is porous, and has lost about 19 grams in weight since being taken out of the earth.—Chem. News, Oct. 11, 1895, 185; from Compt. rend., Sept. 23, 1895.

*Graphite—Characters of a Sample Extracted from Pegmatite.*—Henri Moissan has studied a specimen of graphite obtained from a pegmatite from America. In this mineral the graphite appeared in fine laminar crystals, the sides of which often measured more than a centimeter, and they were intimately distributed throughout the entire mass. It is easy to separate the graphite by treating the native rock repeatedly in the water-bath with hydrofluoric acid of 50 per cent. All the feldspar and silica quickly disappears, and the residual graphite is washed with boiling water and dried in the stove. The pegmatite examined contained 12.77 per cent. of graphite, which, on combustion in oxygen at  $690^{\circ}$ , yielded 5.01 per cent. of ash, composed of silica, alumina, lime, and traces of iron. This graphite sprouts. If it is moistened with monohydrated nitric acid,

as recommended by Luzzi, and then heated to dull redness, it sprouts abundantly. The author describes conditions under which it "sprouts," in which the bulk of 6 grams of graphite in a flask holding 500 Cc. increased to such bulk that the vessel had to be changed. This increase, or sprouting, occurred in a mixture of nitric acid and potassium chlorate at a temperature of  $60^{\circ}$ , and it appears to be the only graphite that increases to such volume under the conditions named.—Chem. News, Nov. 15, 1895, 235-236; from Compt. rend., cxxi, 538.

*Graphites—Classification*—Henri Moissan has compared the specimen of graphite referred to with the graphite of Ceylon, Borrowdale, Ticonderoga, Greenville, Omesnack (Greenland), Mugrau (Bohemia), Scharzbach, and South Australia, and concludes that the graphites occurring in nature may be classified as proposed by Luzzi, as sprouting and non-sprouting varieties. The former seem to have been produced by the action of melted baths—especially metallic baths. The latter may be due to the action of a high temperature on any kind of amorphous carbon.—Chem. News, Nov. 8, 1895, 229; from Compt. rend., October 21, 1895.

*Animal Charcoal—Use as a Pill Excipient for Creasote, Croton Oil, etc.*—See *Pills*, under "Pharmacy."

*Carbides—Various New Metallic Compounds.*—H. Moissan has succeeded in preparing cerium and lithium carbides by the aid of the electric furnace.

*Cerium Carbide*,  $\text{CeC}_2$ , is a crystalline body analogous to "calcium carbide," and is decomposed in the presence of cold water, a gaseous mixture of acetylene, ethylene, and methane being evolved, and a mixture of liquid and solid carbides remains. Its density is 5.23.

*Lithium Carbide*,  $\text{LiC}_2$ , is a carbide comparable in every respect with the carbides of calcium, barium and strontium. It is obtained as a transparent crystalline mass, of density 1.65 at  $18^{\circ}\text{C}$ ., and decomposed by water with formation of pure acetylene gas, rapidly at ordinary temperatures and violently at  $100^{\circ}\text{C}$ . One kilo yields 587 litres of acetylene gas.

*Manganese Carbide*,  $\text{Mn}_3\text{C}$ , discovered by Troost and Hautefeuille, has a density of 6.89 at  $17^{\circ}\text{C}$ , according to Moissan. Water reacts with it to form a white hydrated oxide, and a mixture of equal parts of methane and hydrogen is given off as gas.

*Yttrium Carbide*,  $\text{YC}_2$ , was prepared by Moissan and Etard. Its density is 4.13, and water decomposes it with formation of white hydrated oxide, acetylene, methane, ethylene, and hydrogen. It consists of microscopic yellow crystals.

*Thorium Carbide*,  $\text{ThC}_2$ , obtained by the same authors, also consists of small yellow crystals, has a density of 8.96, and is decomposed like yttrium carbide, a small quantity of liquid and solid hydrocarbons being found at

the same time.—Pharm. Jour., March 28, 1896, 241; from Compt. rend., cxxii., 357-362, 421-573.

*Carbon Monoxide*.—Oxidation to  $\text{CO}_2$  by passing it over oxides of iron heated in a porcelain tube to a dull redness. See *Oxides of Iron*, under "Ferrum."

*Carbon Monosulphide*.—*Probable Characters*.—The results of A. Denninger's experiments, while not entirely satisfactory, lead him to the opinion that carbon monosulphide is a liquid boiling at a low temperature, and having a pleasant smell of carbon disulphide. It is readily combustible, and is absorbed with avidity by alcohol and by aniline.—Chem. News, Jan. 10, 1896, 23; from Jour. f. parkt. Chem., Nos. 5, 6, 7, 1895.

#### CYANOGEN COMPOUNDS.

*Hydrocyanic Acid*.—*Formation and Distribution in Pangium Edule*.—The investigations of Dr. M. Treub on the formation and distribution of hydrocyanic acid in *Pangium edule*, show that the acid is one of the earliest nitrogenous products of assimilation in the plant. Both in the cortex and pith special cells rich in the acid were found, and it could also be detected in the pericycle, as well as in the parenchyma cells of the leaves, and in the flowers and fruits. The phloem provides the channel along which the acid is conveyed, after being formed in the leaves, and the special cells containing hydrocyanic acid in the young plant subsequently become proteid stores. The presence of carbohydrates and the supply of nitrates from the soil are essentials of the formation of the acid.—Pharm. Journ., June 27, 1896, 503; from Annals of the Buitenzorg Bot. Garden, xiii, 1, through Bot. Zeitg., 1896, 102.

*Hydrocyanic Acid*.—*Determination in Bitter Almond Water, etc.*—Denigès makes some practical observations on the determination of hydrocyanic acid in bitter almond water, and in the estimation of pure cyanide in potassium cyanide. To 10 Cc. of

*Bitter Almond Water*, 1 Cc. of ammonia (water? Rep.) is added, and in case that turbidity is produced, this is followed by 0.5 Cc. of alcohol to clarify. A few drops of potassium iodide solution are then added, and the mixture is titrated with  $\frac{1}{10}$  N. silver nitrate solution to permanent turbidity. Each cubic centimeter of the silver solution corresponds to 0.0054 Gm. hydrocyanic acid. For the examination of

*Potassium Cyanide*, 1 gram of the salt is dissolved in sufficient water to make 1 liter; 100 Cc. of the solution are mixed with 10 Cc. of ammonia and a few drops of potassium iodide solution, and the liquid is then titrated with  $\frac{1}{10}$  N. silver nitrate solution as in the case of bitter almond water: 1 Cc. of the silver solution corresponding to 0.013 Gm. potassium cyanide. In case the cyanide contains sulphides, 1 Gm. is dissolved in 100 Cc. of water and 25 Cc. ammonia; 1 Gm. of zinc sulphate is added, the volume

brought to 1 liter, the precipitate of zinc sulphide allowed to subside, and the clear liquor titrated as in the first case.—Pharm. Centralh., July 18, 1895, 410; from Jour. de Pharm. et de Chim., 1895, No. 10.

*Hydrocyanic Acid—Antidotes.*—A publication of the Hungarian toxicologist, Johann Antal (Pharm. Zeitschr. f. Russl., **33**, 518), in which he recommends cobaltous nitrate as an antidote for prussic acid, led John G. Spenzer to try not only the previously suggested antidotes, but also the members of the iron and cobalt groups, to see if these metals, so closely allied in their chemical characters, have similar antidotal effects. Mr. Spenzer's experiments are recorded at some length, and lead to the conclusion that the antidote is of doubtful practicability, for in the case of a two per cent. acid, *death is so rapid that the antidote should be close at hand and used with all dispatch.* If this is done, it will certainly react well and prove to be the nearest to an ideal antidote yet proposed. The only other substance which has been proposed as an antidote and possesses any value as such is *hydrogen peroxide*, which probably acts, as suggested by Loyssell, by saturating the blood and blood corpuscles, not yet poisoned, with oxygen, and thereby keeps the brain in activity.—Proc. Ohio Pharm. Assoc., 1895, 59-63.

*Cyanides—Industrial Production.*—H. N. Warren observes that since the establishment of the cyanide process for the separation of gold from ores, there has been quite a race for the production of cyanides cheaply. Among the newer methods, that contemplating the use of potassium nitrate and of potassium nitrite have engaged most attention; the former appears to meet with fair success, and the potassium nitrite method promises good results. Rochelle salt, mixed with a quarter of its weight of potassium nitrite,  $\text{KNO}_2$ , and ignited, has given 5 per cent. as the highest yield, but anhydrous sodium acetate, used in place of Rochelle salt, has yielded as much as 30 per cent. of alkali cyanide; whilst in a more recent experiment a mixture of 4 parts of wheaten flour to 1 part of nitrate, and the whole thoroughly mixed with 3 parts of magnesia and compressed into blocks, yielded, after ignition, from a varying percentage up to 15 per cent. of cyanide. The author also makes some observations on the old method for the production of cyanides, and states that the use of lime or barium oxide will probably be found a valuable addition, the barium and calcium cyanides being more readily formed than the alkali cyanides.—Chem. News, July 26, 1895, 40.

*Mercury Oxycyanide—Preparation, etc.*—Mercury oxycyanide has the composition  $\text{HgO} \cdot \text{Hg}(\text{CN})_2$ , and is easily soluble in water, but very sparingly in cold water or in alcohol. It is stated in "Pharm. Ztg." that this compound is readily obtained by boiling a cold saturated solution of mercury cyanide with an excess of mercuric oxide, immediately filtering, and allowing the filtrate to cool, when it will crystallize out. It may also be

obtained by saturating hydrocyanic acid with mercuric oxide, washing the undissolved portion with boiling water, and crystallizing.—Pharm. Centralh., Oct. 24, 1895, 616.

*Cyanates—Determination of their Presence in Cyanides.*—E. A. Schneider determines small quantities of cyanate in potassium cyanide by passing carbonic acid into the concentrated solution until the hydrocyanic acid has been completely disengaged, precipitating the potassium carbonate by alcohol, and adding to the filtrate a few drops of acetic acid and cobalt acetate solution. In presence of cyanate, the liquid assumes a blue color.

Utescher, referring to this process, recommends the following as being less circumstantial and more delicate: Potassium iodide, starch paste, and dilute sulphuric acid are added to the solution of potassium cyanide. In the presence of even small quantities of cyanate, iodine is liberated and the liquid assumes a deep blue color.—Pharm. Centralh., Oct. 10, 1895, 585; from Ber. d. Chem. Ges., 1895, No. 12, and Apoth.-Ztg., 1895, No. 66.

*Ammonium Cyanate—Transformation into Urea.*—James Walker and F. J. Hambly call attention to the observation made by them that the transformation of ammonium cyanate into urea is reversible, the urea under certain conditions being re-transformed into ammonium cyanate. In a note on the same subject, H. J. H. Fenton states that he had made a similar observation in 1888, which he communicated to the Cambridge Philosophical Society in a paper entitled "The Metameric Transformation of Ammonium Cyanate." The hypothesis that urea and ammonium cyanate are tautomeric forms, transformable the one into the other, would account for some of the properties of urea which are otherwise difficult to understand.—Chem. News, July 26, 1895, 46; from Proc. Chemic. Soc.

*Calcium Cyanate—A New Nitrogenous Manure.*—Camille Faure calls attention to calcium cyanate— $\text{Ca}(\text{CNO})_2$ —as promising to become an important substitute for nitrate of soda as a fertilizer, and containing even a larger percentage of assimilable nitrogen. Hitherto a laboratory curiosity, the compound is prepared industrially as follows: A mixture of limestone and coke is submitted to a preliminary temperature of  $1500^\circ$  in an electric blast furnace; it is then superheated in the same furnace to  $2500^\circ$  in presence of a large excess of pure nitrogen, and finally subjected to oxidation by means of air, the oxygen of which is retained by the product, whilst the nitrogen conveys the heat due to the oxidation into the electric chamber. The operation must be conducted in a large furnace, so that the calorific yield may be sufficiently economical.—Chem. News, Oct. 18, 1895, 197; from Compt. rend., Sept. 30, 1895.

*Ammonium Ferricyanide—Use in the Qualitative Analytical Course in Place of Ammonium Sulphide.*—Tarugi, in view of the fact that the substitution of ammonium thioacetate for ammonium sulphide in the quali-

tative analytical course has not proven practicable, now proposes "ammonium ferricyanide" as follows :

The filtrate of the third group ( $\text{NH}_3$ ) is boiled to expel ammonia, acidulated with hydrochloric acid, ammonium ferricyanide added, and heated. The precipitate is preserved for examination. The filtrate is rendered ammoniacal, and precipitated with ammonium carbonate (= *calcium, strontium, and barium* carbonates). The filtrate is precipitated with ammonium phosphate, and the precipitate preserved. Acetic acid is added to the filtrate, which precipitates *zinc* as ferricyanide.

*The precipitate obtained with ammonium ferricyanide* is treated with solution of ammonia. The filtrate contains *nickel* ferricyanide, which is precipitable by hydrochloric acid, and the residue contains manganese and cobalt. The *manganese* is recognized by its conversion into permanganic acid by means of lead peroxide and nitric acid, or by melting it with nitre and soda. The *cobalt* is recognized by the pearl color of the reduction flame.

*The precipitate obtained with ammonium phosphate* may contain, besides magnesium, also calcium and aluminum. Upon treatment with acetic acid, *aluminum* remains undissolved as phosphate. From the filtrate oxalic acid precipitates *calcium*, and if it is then rendered alkaline with ammonia, *magnesium* is precipitated as ammonium phosphate.—Pharm. Centralh., Nov. 14, 1895, 661 ; from L'Orosi, **18**, 227.

*Sodium Nitroprusside*.—Use, in ammoniacal solution, as a reagent for *Hydrogen Sulphide*, which see under "Sulphur."

#### ALKALIES.

*Potassium Carbonate—Impurities and Percentage Strength*.—L. T. Schreiner has applied the U. S. P. test to 4 samples of potassium carbonate from different manufacturers, and found No. 1 to be free from impurities and to titrate a strength of 87.5 per cent. No. 2 titrated 84.8 per cent., and was contaminated slightly by earthy impurities and sulphates. No. 3 titrated 87.5 per cent., but was contaminated with earthy impurities, sodium, iron, sulphates, and chlorides. No. 4 titrated 85 per cent., and was very slightly contaminated by sulphates and chlorides. While No. 3 contained sufficient impurities to render it unsuitable for internal use, it contained quite as much alkali as the best and purest sample ; but none of them, it will be noted, contain the required U. S. P. percentage, which is 95 per cent.—West. Drugg., April, 1896, 157.

*Soda—Electrolytic Process of Manufacture*.—At a meeting of the London Section of the Society of Chemical Industry (Dec. 2, 1895) James Hargreaves described his method for manufacturing soda and chlorine by the electrolysis of common salt, which is as follows : The cell employed is a narrow upright vessel, the walls of which on two sides are diaphragms consisting simply of sheets of asbestos composition, non-porous in the



ordinary sense of the term, but when forming the walls of the cell, the contents of which are electrically excited, it allows the molecules of sodium to pass, but very little sodium chloride. In this cell the author suspends two pieces of retort carbon, which are the anodes, whilst a sheet of copper-wire netting outside of each diaphragm forms the cathodes. Each of these is kept in its place by a hollow box, and when the whole are clamped together—inner vessel and two boxes—they form one electrolytic cell. The vessel is filled with brine, and the electric current connected with the poles of the cell. Simultaneously steam and carbonic acid gas are conducted into the hollow boxes. The effect of electrolysis is to cause ionization of the sodium chloride molecules between the copper and carbon, sodium being discharged at the copper end and chlorine at the carbon. Chlorine at once passes off as gas, and the sodium is hydrated and ultimately carbonated, although this carbonating is not essential to the method. An important point of difference between this and other methods is the manner of placing the copper cathodes—viz., outside the salt solution, and bringing them into the electric field by means of steam, which also immediately washes away the sodium hydrate formed in the sphere of the cathode's influence. By means of the asbestos diaphragm, which is the special device of Mr. Hargreaves and of the late Mr. Thomas Bird, it is possible to obtain a soda 10,000 molecules of which contain only 3 molecules of undecomposed salt; whilst, by the construction of an open-texture cathode, the use of air or gases as auxiliary reagents became possible, and the necessity of the immersion of the cathode in liquid was avoided. The cell as described by the author is shown in a cut accompanying the paper, for which see *Chem. and Drug.*, Dec. 7, 1895, 819–820 and editorial 829–830.

*Lithium—Absorption of Nitrogen at the ordinary Temperature.*—In preparing argon by means of lithium, Deslandres observed that hydrogen was evolved, and he heated the lithium in a vacuum in order to separate it. The metal became dark at the surface and showed fissures. After cooling, nitrogen gas was passed over the metal and was slowly absorbed, showing that lithium combines with nitrogen even at the ordinary temperature, the amount of absorption depending upon the extent of bright metallic surface.—*Pharm. Journ.*, Feb. 1, 1896, 81; from *Compt. rend.*, cxxi., 886.

*Lithium Hydride—Character and Composition.*—M. Guntz describes lithium hydride,  $\text{LiH}$ , as a compound of well-defined composition. It is decomposed if heated in a current of nitrogen with the formation of a nitride, and burns in a current of air with the formation of lithia. In its stability at a red heat, its composition, its aspect, and its properties, it is quite distinct from the potassium and sodium hydrides.—*Chem. News*, Feb. 28, 1896, 107; *Compt. rend.*, Feb. 3, 1896.

*Lithium Bromide—Value in Kidney Diseases.*—N. Poliakoff recommends

lithium bromide as being a reliable diuretic, particularly in acute nephritis. He gives tablespoonful doses three or four times daily of a mixture containing : lithium bromide, 1.5 ; sodium bicarbonate, 3.0 ; oleum menthæ pip., 2 drops ; dist. water, 250.0.—Pharm. Centralh., Jan. 2, 1896, 11 ; from Wratsch.

*Lithium Subchloride—Preparation and Character.*—Guntz finds that on heating in a nickel crucible and in a current of hydrogen, 27.4 Gm., LiCl, and 4.7 Gm. metallic lithium to dull redness, a homogeneous, slightly greyish, and very hard compound,  $\text{Li}_2\text{Cl}$ , is obtained. It decomposes water as readily as does lithium itself. He finds also that

*Metallic Lithium* absorbs nitrogen very readily (see also under "Nitrogen").—Chem. News, June 17, 1896, 35 ; from Compt. rend., Dec. 16, 1895.

#### ALKALINE EARTHS.

*Calcined Magnesia—A Difficultly Soluble Sample.*—"Cyx" calls attention to an abnormal sample of calcined magnesia, which, when treated with citric acid in the proportion of 1 : 1,373, did not produce a clear solution until after boiling or upon long standing. It contained 41.5 per cent. of magnesium oxide, and only traces of silica, sulphuric acid, chlorine and alkali. The microscope revealed, as in the normal article, irregular prisms and granules ; but in the normal magnesia the prisms are distributed irregularly, whereas in the abnormal article the granules surrounded the prisms as with a coat. It is presumed that the less easily soluble granules protect the prisms from the action of the acid, and thus retard complete solution.—Pharm. Centralh., January 9, 1896, 16.

*Magnesium Carbonate—Presence of Calcium Carbonate.*—O. Chiappe has observed an admixture (adulteration) of magnesium carbonate with calcium carbonate, the sample containing nearly one-half its weight of the latter. His attention had been drawn to the admixture by the turbidity which was found in a clear solution of magnesium citrate on standing a short time, calcium citrate separating to form a crystalline crust.—Pharm. Centralh., February 6, 1896, 73 ; from L'Orosi, July, 1895, 231.

*Barium, Strontium, and Calcium—Analytical Separation from their Saline Admixture.*—H. Bauligny observes that in the determination of the elements present in a saline solution, the detection of the three alkaline earthy metals, barium, strontium, and calcium, is often regarded as difficult ; but this is due to the defective character of the methods employed, or to a want of precision in the procedures indicated, and may be avoided as follows : Having in the usual analytical process transformed the three alkaline earthy metals into insoluble carbonates by means of ammonium carbonate, they are collected on a filter and washed with dilute hot solution of ammonium chloride which removes any alkali metals, and magnesium if present. The mixture of the three insoluble carbonates is redis-

solved with hydrochloric acid, added slowly, drop by drop, so as to have an approximately neutral liquid. A small excess of acid may be corrected, if needful, by the addition of a proportionate quantity of an alkaline acetate. Potassium dichromate will now precipitate *all the barium*. If then the filtrate is treated with a solution of potassium sulphate containing 2.5 Gm. of the salt per liter, *the strontium* is precipitated after agitating for a few seconds. To detect the calcium in the filtrate from which the strontium has been separated it is necessary to eliminate the chromic acid. To this end the filtrate is heated with potassium carbonate and the washed carbonate is redissolved with hydrochloric acid, correcting the excess of acid, if any, with ammonium acetate. A large excess of sal-ammoniac, either in crystals or in a concentrated solution, is then added, followed by a few drops of potassium ferro-cyanide. *The calcium* is thus precipitated: turbidity is at first produced, then a precipitate, which increases rapidly, and which, according to Rose, is a double compound of potassium and calcium ferro-cyanide—a compound sparingly soluble in water, and insoluble in ammonium chloride. The sensitiveness is such that a solution of calcium sulphate, with the addition of three or four times its volume of water saturated with sal-ammoniac, is rendered strongly turbid, and precipitated after being stirred up for a minute with a little potassium ferro-cyanide. The salts of strontium produce nothing similar even in a highly concentrated solution; the liquid remains perfectly clear.—Chem. News, July 29, 1895, 27-28; from Bull. de la Soc. Chim. de Paris.

*Strontium Iodide—A New Crystalline Variety.*—Tassily has obtained strontium iodide in crystals, corresponding to the formula  $\text{SrI}_2 \cdot 7\text{H}_2\text{O}$ , thus differing from the crystalline iodide described by Croft, which contained a molecule of water less. Similarly, by evaporating a concentrated solution of

*Calcium Iodide* at ordinary temperature, the author obtained crystals of the composition  $\text{CaI}_2 \cdot 8\text{H}_2\text{O}$ .—Pharm. Jour., Feb. 1, 1896, 83; from Compt. rend., cxxii., 82.

#### ALUMINUM.

*Aluminum—Presence of Sodium.*—H. Moissan shows that the contradictory results obtained by different investigators when dealing with aluminum have been due to the admixture of the metal with foreign substances. Among these are nitrogen and carbon, and recently the author has found sodium in aluminum, which also causes a notable difference. The presence of sodium is due to the mixture of cryolite with alumina treated by electrolysis, and as much as 0.1 to 0.3 per cent. has been detected. By the action of cold water—or even dilute alcoholic liquids—the sodium is oxidized, the alkali combines with the metal to form an aluminate, and this in its turn is decomposed by the action of the water, alumina being deposited and the liberated soda free to act again upon the metal.—Pharm. Jour., Dec. 28, 1895, 534; from Compt. rend., cxxi., 794.

*Aluminum—Various Alloys, and a Suitable Solder.*—According to Prof. Richards, the alloys of aluminum with gold have a fine red color, and are utilized in jewelry. Among the alloys of nickel, that known as “roseine” is composed of nickel, 40; aluminum, 30; tin, 20; silver, 10. The alloy “manganine” consists of copper, 67.5; aluminum, 1.2; manganese, 18; zinc, 13; tin, 5; this is remarkable for its high electric resistance, which is superior to that of German silver. Alloys containing both nickel and copper with aluminum possess great tenacity, three of them being described, prepared in the following proportion:

Cu .....	88 .....	90 .....	64
Ni .....	1 .....	3 .....	33
Al .....	1 .....	3 .....	3
Sn .....	1 .....	6 .....	0

The latter is the most tenacious of the three, and is suitable for table cutlery. As a

*Solder for Aluminum*, Prof. Richards particularly recommends a mixture of: Aluminum, 3 p.; zinc, 26 p.; tin, 70 p.; tin phosphide, 2 p. It should be applied without flux upon the article, previously roughened and heated, if possible, to the melting point of the solder.—Chem. News, June 26, 1896, 306; from Bull. Soc. d'Encourag. pour l'Industrie Nationale (5) I., No. 3.

*Aluminum—Resistance of Utensils to Wear and Tear*—Balland states that cooking utensils made of aluminum offer satisfactory resistance to the wear and tear inseparable from the conditions of a soldier's life. Any undue loss or wear observed is probably due to the presence of other metals in the rivets, etc., and the author points out that much deception is practiced with regard to aluminum, and that most articles offered in that metal are really prepared from alloys, or from aluminum containing as much as 8 per cent. of impurities. He says that metal can be obtained practically pure (0.7 to 0.9 per cent. of foreign substances), but efforts should be made to render it more homogeneous and capable of taking a higher polish. He specially recommends that the use of solder, and rivets, etc., made of foreign metals should be avoided; for it is apparent that electrical action is the chief cause of the disintegration of aluminum vessels in use at the present time.—Pharm. Jour., September 28, 1895, 263-264; from Compt. rend. cxxi., 381.

*Aluminum—Action of Carbolic Acid*, which see, under “Organic Chemistry.”

*Aluminum Chloride—Preparation of Pure Crystals.*—Denis states that if dry hydrochloric acid gas is passed into a solution of impure aluminum chloride in concentrated hydrochloric acid, hexagonal crystals of  $\text{AlCl}_3 + 6\text{H}_2\text{O}$  will separate, while ferric chloride remains in solution. The compound does not lose water when kept over sulphuric acid, but in moist air

absorbs water.—Pharm. Centralh., Nov. 7, 1895, 650; from Ztschr. f. anorg. Chem., 1895, 339.

#### GLUCINUM.

*Glucinum—Industrial Production.*—It is stated in "Ironmonger" (Nov. 16, 1895) that glucinum is emerging from its position as a chemical rarity. It is lighter even than aluminum, but its chief value consists in the fact that its electrical conductivity is as high as that of silver, and, consequently, higher than that of copper. It is less extensible than iron, and more durable, and its value is only one-tenth the price of platinum, weight for weight, and one hundred and sixtieth its price, volume for volume.—Amer. Journ. Pharm., Jan., 1896, 52.

*Glucinum—Manufacture in large quantity.*—H. N. Warren describes the process employed in the manufacture of a large quantity of glucinum, which has since been worked into various articles of jewelry in possession of the Ameer of Afghanistan. Six pounds of emerald dust and stones of dull water were ground to a fine powder, the powder was thoroughly incorporated with four times its weight of sodium carbonate, and fused for three hours at the highest temperature of a powerful Hart furnace. The melt was then treated with superheated steam, and further treated with hydrochloric acid and evaporated to dryness in order to render the silica present insoluble. The residue of evaporation was dissolved, the silicious residue washed and expressed, and the filtrate, after being freed from iron and chromium by acetates, in accordance with the usual method of separation of these metals, was rendered alkaline by an excess of sodium carbonate. The precipitate so obtained was treated with an excess of gaseous sulphurous acid, which dissolves both alumina and glucina, and the solution obtained was then heated to ebullition, whereby the alumina was precipitated in a granular form. The glucina solution was filtered off and the precipitated alumina washed with the greatest ease. This second filtrate was now boiled with an excess of ammonium carbonate, the granular precipitate of glucinum carbonate was washed, mixed intimately with an excess of lamp-black and ignited out of contact with the atmosphere, the mass thus obtained being afterwards converted into bromide by acting upon it with bromine vapor at a full red heat in clay retorts. The bromide distils over, and is readily reduced to the metallic form by decomposing the same with a current of 12 volts and 8 ampères.—Chem. News, Dec. 27, 1895, 310-311.

*Glucina—Preparation of a Pure Product.*—P. Lebian, after describing the method of Woehler and the more expeditious modern method by the aid of the electric furnace for attacking the emerald and producing impure glucina, describes a method for the

*Purification of Glucina*, which is briefly as follows: The impure glucinum carbonate is redissolved in nitric acid, a little potassium ferrocyanide

is added to throw down iron, the solution is filtered, the filtrate treated with copper nitrate to remove excess of ferrocyanide, and the excess of copper is removed from the filtrate by a current of hydrogen sulphide. The filtrate now only contains a little alumina as impurity, which is removable by taking advantage of the property of aluminum hydroxide to assume an insoluble condition on standing for some time. To this end the solution freed from iron is precipitated by ammonia and allowed to stand three or four days; the supernatant clear liquid is then decanted and replaced by a concentrated solution of ammonium carbonate, which slowly dissolves the glucina, and leaves the alumina undissolved. The filtrate is heated to ebullition, the precipitated glucina thus formed is dissolved in pure nitric acid, the solution of glucinum nitrate evaporated to dryness, and ignited. Glucina is thus obtained in a dense, absolutely pure form.—Chem. News, Jan. 3, 1896, 3-4; from Compt. rend., cxxi., 641.

#### YTTRIUM, CERIUM, AND OTHER METALS OF THE EARTHS.

*Carbide of Yttrium—Characters, etc.*—H. Moissan and M. Etard state that yttria forms a carbide of the formula  $C_2Y$ . It occurs in transparent crystals, decomposable by cold water, with formation of a gaseous mixture rich in acetylene, and containing methane, ethylene, and a small quantity of hydrogen.

*Carbide of Thorium* was also obtained in form of a crystalline compound,  $C_2Th$ . It is decomposed by water, producing gaseous carbides, poorer in acetylene, but richer in free hydrogen.—Chem. News, April 2, 1896, 164; from Compt. rend., Mar. 9, 1896.

*Carbide of Zirconium.*—A new carbide of zirconium,  $CZr$ , is described by H. Moissan and M. Longfeld. It is produced by heating zirconia and carbon in the electric furnace outside of the arc. It is well crystalline, of a gray metallic aspect, not affected by air, whether dry or moist, even at  $100^\circ$ , and not decomposable by water at any temperature up to  $100^\circ$ , but is attacked readily by the hydracids: hydrofluoric acid in the cold, hydrochloric at  $250^\circ$ , hydrobromic at  $300^\circ$ , and hydriodic at  $400^\circ$ . It scratches glass and quartz with ease, but not the ruby. At a dull redness it burns in oxygen with much lustre. It is attacked by concentrated nitric acid with much violence, and is also attacked with much energy by oxidizing agents, the action of potassium chlorate being explosive. By melted potassa it is dissolved with ease.—Chem. News, April 10, 1896, 175; from Compt. rend., Mar. 16, 1896.

*Thorium, Cerium, Lanthanum, Didymium, and Zirconium—A New and Abundant Source.*—T. L. Phipson calls attention to a recent observation that the ordinary Norwegian granite, which is used in his locality for the kerb stones which pave the road in the neighborhood of his laboratory at Putney, contains an abundance of the rare metals named in the above caption, as much as 2 per cent. of rare oxides and carbonates having been

obtained by him by a process which he describes.—Chem. News, Mar. 27, 1896, 145.

#### MANGANESE.

*Potassium Permanganate*.—Characteristic crystalline compound with *Aconitine*, which see under "Organic Chemistry."

*Calcium Permanganate—Superior Antiseptic Properties*.—E. Merck calls attention to the calcium permanganate,  $\text{Ca}(\text{MnO}_4)_2 + 5\text{H}_2\text{O}$ , which resembles the potassium salt in its appearance, though less distinctly crystalline, and is characterized by its extremely easy solubility. As an antiseptic it has been found superior to corrosive sublimate, and Bordas regards it as being an ideal antiseptic, since it combines non-toxicity and non-corrosiveness with powerful antiseptic action. Thus, its action is a hundred times greater than that of potassium permanganate on account of the rapidity with which it splits up in the cold, when brought in contact with organic matter, into oxygen, manganese oxide and calcium oxide. This renders it particularly efficient for the purification of drinking water. In case an excess is employed, such is readily removed by the addition of one of the lower manganese oxides, which reduce the permanganate and convert it into manganese peroxide. Merck, in this connection, calls attention to

*Magnesium Permanganate* ( $\text{Mg}(\text{MnO}_4)_2 + 6\text{H}_2\text{O}$ ), as possibly offering similar advantages as an antiseptic. It occurs in form of granular, blue-black crystals, which are readily and completely soluble in water.—Pharm. Centralh., Feb. 20, 1896, 109.

#### IRON.

*Iron—Review of its History, Chemistry, Pharmacy and Therapy*.—Charlie Gee gives a concise review of the history, chemistry, pharmacy and therapeutic uses of iron, which brings no new information, and cannot be profitably abstracted for this report. See Merck's Report, Dec. 15, 1895, 506–507.

*Reduced Iron—Examination of Commercial*.—Lyman F. Kebler has examined six commercial samples of reduced iron (Nos. 1 to 6) and two of iron filings in No. 80 powder (Nos. 7 and 8), following the directions of the U. S. P., except that the mixture of mercuric chloride and iron was heated for one and a half instead of one hour. His results are given as follows:

No.	Color.	Residue.	Metallic Iron.	Sulphides.	Arsenic.	Reaction.
1	Grayish-black	1.12	52.56	Trace	Trace	Neutral
2	Gray	0.45	84.34	Trace	Trace	Neutral
3	Black	2.36	38.60	Trace	Trace	Neutral
4	Gray	1.48	78.97	None	Trace	Neutral
5	Gray	1.83	76.05	None	Trace	Neutral
6	Gray	0.95	81.90	Trace	Trace	Neutral
7	.....	2.21	97.11	Trace	Excess	Neutral
8	.....	1.01	91.26	Trace	Excess	Neutral

*Ferric Chloride—Action of Nitric Oxide*, which see under “Nitrogen.”

*Ferrous Iodide—A Tasteless Form.*—The following method for preparing a tasteless preparation of ferrous iodide in the dry state, is given in “*Jour. de Pharm*” (1895, 171): Ferrous iodide is prepared in the usual manner by the interaction of 81.85 Gm. of iodine with a sufficient quantity of metallic iron and water. The solution is filtered and 40.87 Gm. of iodine are dissolved in it; a solution of 130.25 Gm. of citric acid is then accurately saturated with potassa, added to the iron solution, and the green solution carefully evaporated to dryness. The resulting cauliflower-like crystalline mass is permanent if direct sunlight is excluded, and may be used, in the properly calculated properties, to make tasteless solutions or syrups of ferrous iodide of any desired strength.—*Pharm. Centralh.*, Aug. 8, 1895, 452.

*Oxides of Iron—Reduction by means of Carbon Monoxide.*—Isaac Braithwaite has determined that by passing carbon monoxide through ferric oxide heated to a low red heat in a porcelain tube, the iron compound gradually became reduced completely to the metallic state. By passing the same CO repeatedly over the  $\text{Fe}_2\text{O}_3$ , the CO is completely or almost completely converted into  $\text{CO}_2$ . If the  $\text{Fe}_3\text{O}_4$  is substituted for  $\text{Fe}_2\text{O}_3$ , rather more than two-thirds of the CO is oxidized to  $\text{CO}_2$ , whilst with FeO only about one-third is oxidized, leaving a mixture of  $2\text{CO} + \text{CO}_2$ .—*Chem. News*, Nov. 1, 1895, 211.

*Ferrous Ammonium Sulphate—Preparation of a Pure Salt.*—G. E. Westley observes that the preparation of ferrous ammonium sulphate by the published methods is not always satisfactory, and recommends the following method, which secures a granular salt that will assay 100 per cent. with pure dichromate. Take of ferrous sulphate, 278 grains; ammonium sulphate, 132 grains. Dissolve the two sulphates in a small quantity of cold water, filter the solution if necessary, and warm gently to  $35^\circ\text{--}40^\circ\text{C.}$ , to promote chemical action. Too great heat must not be used, or the solution will be decomposed with production of ferric oxysulphate. The solution is poured into alcohol, the fine granular crystals of ferrous ammonium sulphate are collected on a calico filter, washed with alcohol of



the strength of proof spirit, and dried in the air, avoiding dust, etc.—Phar. Jour., Nov. 30, 1895, 457.

#### CHROMIUM.

*Chromic Hydrate—Molecular Transformation.*—According to A. Recoura, normal chromium hydroxide is the precipitate produced by alkalis in a solution of a normal salt of chromium. It is hexatomic, and with 6 molecules of hydrochloric acid regenerates normal chromium chloride. The chromium hydroxide of the green solution is formed by decomposing by an alkali a solution of chromium previously rendered green by ebullition. This fixes only 4 molecules of hydrochloric acid. The author now finds that hexatomic chromium hydrate is transformed into a monatomic base after remaining for three hours in soda. If left for a longer time, it becomes a mixture of monatomic hydrate and of a hydrate of no atomicity.—Chem. News, July 5, 1895, 12; from Compt. rend., cxx, No. 24, 1895.

*Crystalline Chromium Sulphide—Preparation and Properties.*—A. Mourlot shows that the sulphide formed by the action of hydrogen sulphide upon metallic chromium is a protosulphide. By an increase of temperature, he has effected the crystallization of this sulphide, which possesses great stability.—Chem. News, Jan. 17, 1896, 35; from Compt. rend., Dec. 16, 1895.

*Potassium Chromates.*—Use as preservative for *Milk*, which see under "Organic Chemistry."

#### NICKEL AND COBALT.

*Nickel and Cobalt—Atomic Weights.*—Clemens Winkler has undertaken a revision of the atomic weights of nickel and cobalt, with the object of ascertaining which of the two has the higher atomic weight. The experiments were effected by treating the metals with a solution of auro-potassium bromide, dissolving the metals in hydrochloric acid, determining the hydrogen evolved, treatment with solution of iodine in excess, and titrating back the excess of iodine. The average of the determination showed: for *nickel* = 58.7155; for *cobalt* = 59.3678. The author thinks that these figures must be accepted as the true atomic weight of nickel and cobalt, referred to  $H = 1$  and  $I = 126.53$ .—Chem. News, Aug. 2, 1895; from Zeitschr. Anorg. Chem.

*Cobalt—A New Compound Available for its Detection in Presence of Nickel.*—R. G. Durrant states that if excess of sodium or potassium is added to a solution of any salt of cobalt, and then hydrogen peroxide, a green liquid is formed, which appears to a cobaltate, or

*Cobaltic Acid,  $H_2CoO_4$ .*—Although this substance has not at present been isolated, volumetric determinations show that the maximum green color is reached when the molecular proportions of the cobalt salt and hy-

drogen peroxide are as 1 : 2. A probable reaction is  $\text{CoCO}_3 + 2\text{H}_2\text{O}_2 = \text{H}_2\text{CoO}_4 + \text{CO}_2 + \text{H}_2\text{O}$ . The green solution may be formed in presence of nickel salts, and the reaction serves as a ready method of detecting cobalt, even in presence of large excess of nickel.—Chem. News, May 15, 1896, 228.

*Cobalt Carbonate.—Availability as a Test for Hydrochloric Acid in the Gastric Juice.*—Cobalt carbonate, which was recommended (1892) by Contjean as a reagent for free hydrochloric acid in the gastric juice, has now been studied in this connection by Kwiatnawski, who finds it to be not alone a hundred fold more sensitive than the phloroglucin-vanillin reaction, but that the reaction is not interfered with by the chlorides and acids—lactic, butyric, acetic—or by peptones and the acid sodium phosphate, that may be present with free hydrochloric acid in the stomach. The test depends upon the formation of a rose-red color, which even changes to a blue, when free hydrochloric acts upon cobalt carbonate. Inconveniences are the tardiness of the reaction, and the necessity of preparing the cobalt carbonate freshly at each time when the test is to be made.—Pharm. Centralh., May 14, 1896, 302; from Monit. de Pharm., 1895, 1936.

*Cobaltous Nitrate.*—Value as an antidote to poisoning by *Hydrocyanic Acid*, which see under "Cyanogen Compounds."

#### ZINC.

*Zinc—Preparation of the Purest Metal.*—Numerous experiments made by F. Mylius and O. Fromm with the object of preparing the purest form of zinc lead them to the following conclusions: 1. The zinc designated in commerce as "pure" contains in every instance readily-determinable quantities of cadmium, lead and iron. 2. Solution of zinc sulphate can be purified by the electrolytic method so effectively that no foreign heavy metals can be detected in it by chemical analysis. Zinc oxide of corresponding purity is readily obtained by chemical methods. 3. The zinc obtained from the sulphate or oxide by electrolysis contains determinable quantities of platinum, which is derived from the anode. 4. The purest form of zinc is obtained by repeated electrolytic refinement of the metal in basic zinc sulphate solutions. The product is spongy and requires remelting and sublimation in a vacuum. 5. The metal so obtained, while not absolutely pure, contains at least 99.99 per cent. of zinc, and the impurities amount at most to 1 in 100,000. 6. In the electrolytic separation of zinc from its solution the secondary decomposition of water cannot be completely avoided. 7. The formation of "spongy zinc" takes place by the aid of oxygen.—Pharm. Centralh., Aug. 8, 1895, 452; from Berichte, 1895, No. 12.

*Zinc Chloride—Dissociation by Water.*—Perrot has observed that when

zinc chloride, free from oxide, was dissolved in water, a precipitate was formed, which had the composition:  $\text{ZnCl}_2, 5\text{ZnO}, 6\text{H}_2\text{O}$ . An inquiry into the relations of the quantity of water to the amount of oxychloride formed resulted in the determination that by employing 100 mol. of water, 3.25 per cent. of oxychloride was formed; the same quantity was formed with 75 mol., 3 per cent. was found with 50 mol., and 2.6 per cent. with 25 mol. The limit of the reaction is, therefore, with 75 mol. of water, the addition of larger quantities giving no increase in the yield of oxychloride.—Pharm. Centralh., Jan. 23, 1896, 46; from Bull. Soc. Chim., 1895, 975.

*Zinc Oxide—Comparison of the Products obtained by Combustion and by Precipitation.*—Wm. Elborne observes that the white zinc oxide, which is obtained by combustion of the metal, appears to be in disrepute for the purpose of making ointment, it being spoken of as gritty and liable to be contaminated with particles of metal. Such, however, is not his experience with it, and his dispensers have for years given preference to it over the yellowish white kind, obtained by precipitation as carbonate and subsequent calcination. The white kind is held by them to make a much better ointment.—Chem. and Drug., Jan. 18, 1896, 85.

#### BISMUTH.

*Bismuth Subnitrate—Commercial Quality.*—Prof. Charles O. Curtman has examined seven samples of subnitrate of bismuth of the market, which were all exceedingly light and voluminous, and would pass muster in regard to the *qualitative* tests of the U. S. P. The *quantitative* examination, however, showed them nearly all to be more basic than is demanded by the formulas that are generally accepted for its composition. Of these, the formulas given in Flückiger's Pharmaceutical Chemistry require the least amount of acid, and are therefore brought in comparison by the author. They are as follows:

A. The compound representing the salt as first precipitated:  $\text{BiONO}_3 + \text{H}_2\text{O}$ .

B. The same salt after protracted washing:  $\text{BiOOH} + \text{BiONO}_3$ .

C. The salt formed by long contact with acid wash-water:  $(\text{BiONO}_3)_2 + \text{H}_2\text{O}$ ; and,

D. The salt B containing water:  $\text{BiOOH} + \text{BiONO}_3 + \text{H}_2\text{O}$ .

These four compounds contain as follows:

	Water lost at 120° C.	$\text{Bi}_2\text{O}_3$ after ignition.	Nitric Acid ( $\text{NO}_3$ ).
A.....	5.894 per cent.	76.413 per cent.	20.311 per cent.
B.....	—	88.101 "	11.709 "
C.....	1.54 per cent.	80.800 "	21.247 "
D.....	3.286 "	85.206 "	11.324 "

The only quantitative tests relating to the proportion of its normal constituents are implied in the pharmacopœial description of the salt, which

states that, when heated to  $120^{\circ}\text{C}$ ., it loses water (from 3 to 5 per cent. of its weight), and when subsequently heated to redness, it leaves from 79 to 82 per cent. of its weight of yellow residue. In addition to these determinations the author determined the percentage of nitric acid radical in the seven samples under examination, with results as follows :

	Water Lost at $120^{\circ}\text{C}$ .	$\text{Bi}_2\text{O}_3$ after ignition.	Nitric Acid ( $\text{NO}_3$ ).
1 .....	4.1 per cent.	82.0 per cent.	10.80 per cent.
2 .....	5.9 per cent.	82.5 per cent.	11.45 per cent.
3 .....	5.3 per cent.	83.1 per cent.	10.21 per cent.
4 .....	3.2 per cent.	85.0 per cent.	9.90 per cent.
5 .....	3.1 per cent.	81.2 per cent.	10.53 per cent.
6 .....	3.0 per cent.	82.0 per cent.	11.45 per cent.
7 .....	3.2 per cent.	81.1 per cent.	10.53 per cent.

These results show that Nos. 2, 3 and 4 exceed the limit of residue  $\text{Bi}_2\text{O}_3$  given in the U. S. P.; also that Nos. 2 and 3 lose more water than prescribed. As already mentioned, nearly all the specimens are more basic than is demanded by any of the accepted formulas, and it therefore becomes a pertinent question whether the commercial products must be considered as having more basic formulas, or, as is more likely, that they are mixtures in indefinite proportions of bismuth hydroxide with the real substitutes. Clinical experience with these more basic preparations can alone decide whether they are sufficiently useful to recognize them by enlarging the pharmacopœial limits, so as to include them in the official standard.—Pharm. Era, Jan. 6, 1896, 43–44.

#### URANIUM.

*Uranium—Properties.*—H. Becquerel, in a previous paper, has shown that the salts of uranium emit radiation possessing properties some of which are comparable to those of Röntgen's X-rays. He now gives further details, and states that he has also experimented with metallic uranium, in a state of powder. He finds that it possesses the same power in a more marked degree, this being the first case recorded of a metal possessing what may be termed "invisible phosphorescence." Metallic uranium may best be obtained by reducing uranium oxide by means of carbon, in the electric furnace, but two other methods, the decomposition of the double fluoride of uranium and sodium by means of metallic sodium, or by electrolysis, also give good results, these several methods having been recommended by H. Moissan. The author states that uranium can be obtained in crystals, and that the pure metal has properties closely resembling those of iron, especially as regards filing, carburetting, tempering, and oxidizing. It is oxidized, however, with greater facility than iron, and in fine powder slowly decomposes water in the cold. The action of uranium on the hydracids is also more energetic than that of iron, and the

metal possesses a great affinity for nitrogen, but does not affect the magnetic needle. Moreover, it is much more volatile than iron in the electric furnace.—Pharm. Journ., June 27, 1896, 501; from Compt. rend. cxxii, 1086 and 1088.

*Carbide of Uranium—Preparation and Properties.*—Henri Moissan has obtained uranium carbide by heating 800 Gm. of a mixture of 50 p. of the green uranium oxide and 6 p. of sugar charcoal, both in fine powder, contained in a crucible of coke, in the electric furnace, for eight or ten minutes, using a current of 900 ampères and 50 volts. The reaction is produced with an issue of electric sparks. The liquid carbide is allowed to solidify and cool in the furnace. Uranium carbide has a crystalline fracture, sp. gr., at  $18^{\circ} = 11.28$ . It scratches rock crystal, but not corundum. It takes fire if pulverized without precaution, is attacked by fluorine if slightly heated, and by chlorine at  $350^{\circ}$ , and by bromine at  $390^{\circ}$ . Hydrochloric, sulphuric and nitric acid attack it slowly in the cold, and its behavior with water results in the production of hydrogen carbide, both gaseous, liquid and solid. Its composition corresponds to the formula,  $C_3U_4$ .—Chem. News, Mar. 6, 1896, 118; from Compt. rend., Feb. 10, 1896.

#### COPPER.

*Copper—Purification in Japan.*—The following method for the purification of copper is, according to Pharm. Post, practiced in Japan: The crude material is melted with lead and then puddled with charcoal. The lead flows off and carries bismuth and silver with it. After the lead has been thus removed, a layer forms on the edge of the copper ingot, composed of arseno-antimonate, which is easily removed. In this manner all of the arsenic, antimony, lead, bismuth and silver are removed from the copper, which is obtained pure to the amount of 99 per cent.—Pharm. Centralh., Oct. 10, 1896, 586.

*Copper—Accurate Method of Determination.*—Dr. B. H. Paul and A. J. Cownley, after reviving the methods of Lehmann and of Vedrödi (see below), observes that in both methods there is liability to error. Lehmann's method is open to the objection that copper is very liable to be left undissolved by sulphuric acid. In Vedrödi's method it is uncertain that the hydrochloric acid will take out all the copper from the ash constituents; moreover, all that is precipitated by hydrogen sulphide is regarded as copper. The authors have found a very ready and accurate method to consist in carbonizing about 100 Gm. of the material in platinum, extracting the ash with strong hydrochloric acid, filtering through an acid-washed filter, washing the filter with hot water all into a porcelain dish. The residue, which is insoluble in hydrochloric acid, is treated with a few drops of strong nitric acid, then dried and ignited. The ignited mass is treated with strong hydrochloric acid, and the filtered solution is added to

the first. In this way there is no loss of copper as is likely to occur from the reduction of the copper salt to metallic copper when the carbonization is being carried out, and its subsequent insolubility in sulphuric and hydrochloric acids, as in Lehmann's and Vedrödi's method. The hydrochloric acid solution, having been brought to about 30 to 40 Cc. by concentration, the copper is precipitated by pure zinc and weighed as metal; but if, after weighing, it is not of a pure copper color, it is dissolved in a little nitric acid up to a known quantity, and the copper determined colorimetrically in an ammoniacal solution. In this manner the authors have determined the amount of copper in various alimentary substances—oysters, cocoa, brandy, whiskey and preserved peas, with results shown in a table accompanying their paper. There was contained in 10,000 parts: oysters, 1.81–3.03; cocoa, 0.29–0.58; brandy, 0.01–0.05; whiskey, 0.04; preserved peas (11 samples), 0.54–1.44 parts. Comparison with Vedrödi's figures obtained with natural seeds, show that more copper is naturally present in many vegetable substances than is found in vegetables, for instance peas, to which it has been added to preserve their natural color.—Pharm. Journ., June 6, 1896, 441–442.

*Copper—Determination in Vegetables.*—Victor Vedrödi calls attention to some discrepancies that have resulted in the determination of copper in the same material by a method employed by Dr. K. B. Lehmann and by the method employed by him. Believing that the experiments were by both carried out conscientiously, he believes the difference in the results must be inherent to the method employed, and that the method of Lehmann, which is a colorimetric one, is defective, indicating far less quantities of copper than are actually present, and demonstrable by his own gravimetric method. The method of Lehmann consists in mineralizing the substances in a porcelain capsule with the addition of concentrated sulphuric acid free from copper, and determining the amount of copper in the mineralized substance by the intensity of the colors of the solutions—the blue color of ammoniacal copper solution or the red color of copper ferrocyanide—and comparison with copper solutions of the same colors and of known strengths. Vedrödi's method, on the other hand, consists in incinerating 10 Gm. of the substance in a porcelain crucible for 8 to 12 hours in a muffle-furnace, dissolving the ash in a little hydrochloric acid, filtering the solution, heating it to near boiling, and saturating it with hydrogen sulphide. The precipitate is collected on a Swedish filter, of known ash content, washed well with hydrogen sulphide water, dried, and incinerated with the filter in a porcelain crucible in the muffle-furnace; after cooling, the substance is moistened with nitric acid, dried, again incinerated, and weighed as cupric oxide, deducting from the ascertained weight that of the filter ash. The author has re-confirmed the adaptability of this method by a number of determinations made with pure metallic copper, and finds the average limit of error per kilogram to be about + 0.12 mgm. Apply-

ing the method to the determination of copper in natural grain, wheat, barley, rye, oats, buckwheat, lentils, peas, etc., he has found them to contain surprisingly large percentages of copper, the following being the amounts (expressed in milligrams) determined by the method in a kilogram of the substance: Winter wheat, 200 to 800; summer wheat, 190–230; rye, 10–30; barley, 10–70; oats, 40–200; buckwheat, 150–160; lentils, 110–150; peas, 60–110 mgm. in 1 kilo, etc., etc.—Chem. Ztg., May 16, 1896, 400–401.

*Copper—Sensitiveness of Various Reagents.*—Schlagdenhauffen communicates the results of comprehensive experiments made to determine the limit of sensitiveness of different copper reagents:

1. *Ammonia.* The blue color produced is distinct in dilutions of 1 : 1000; in dilutions of 1 : 10,000 it may be recognized only by comparison with copper solutions of known strength.

2. *Potassium Ferrocyanide.* A rose-red color is produced in dilutions of 1 : 20,000, if the reagent is added carefully and very diluted.

3. *Tincture of Guaiac.* This will detect 1 : 1,000,000, if the reaction is carried out as follows, but is not available in the presence of ferric salts: The solution, after the addition of an alkaline chloride or bromide (barium bromide best of all) is evaporated to dryness, and tincture of guaiac is added drop by drop.

4. *Bright Iron Wire.* This is available for solutions containing 1 part of copper salt in 10,000.

5. *Hydrobromic Acid.* The violet color produced by the addition of this acid to the residue of evaporation is recognized in dilutions of 1 : 100,000.

6. *Platinized Zinc Wire.* If dipped into the copper solution a gray or black coating is formed upon the wire, which, when exposed to the vapor of hydrobromic acid and bromine—produced by the action of sulphuric acid upon potassium bromide—assumes a violet color, due to copper bromide formed, and is sensitive in solutions of 1 : 1,000,000.—Pharm. Centralh., Aug. 1, 1895, 442; from Monit. de Pharm., 1895, 1751.

*Copper—Relative Sensitiveness of Various Tests in the Presence of Lead Acetate.*—In the course of an examination for the presence of copper in a sample of lead acetate (which see under “Organic Acids”), Dr. Schneider had occasion to make comparative experiments, as to the relative sensitiveness of the various tests for copper in acetate of lead, with results as follows: copper acetate could be detected by soda solution if present in the proportion of 1 : 250; by sodium bicarbonate in the proportion of 1 : 300; ammonia, 1 : 1000; potassium ferrocyanide, 1 : 2000; and with excess of magnesium sulphate if present in the proportion of 1 : 8000. The test is carried out as follows: Add an excess of solution of magnesium sulphate to the solution of lead acetate, allow to precipitate, filter off the

solution from the precipitated lead sulphate, and test with potassium ferrocyanide. The removal of the lead as sulphate renders the test more delicate, inasmuch as under normal conditions the copper reaction with the ferrocyanide is obscured by the formation of lead ferrocyanide.—*Amer. Drugg.*, Oct. 25, 1895, 252; from *Rep. Proc. Soc. Germ. Naturalists and Phys.*, Sept. 1895.

*Silicide of Copper—Characters.*—Vigorous describes copper silicide as a very hard brittle substance, of a steel-gray color if recently fractured, but gradually assuming a reddish aspect. Its composition is represented by the formula  $\text{SiCu}_2$ .—*Chem. News*, March 6, 1896; from *Compt. rend.*, Feb. 10, 1896.

*Cupric Sulphide,  $\text{CuS}$ .—Existence and Preparation.*—It is stated in the "Analytical Chemistry" of Prof. Mentchutkin that the black precipitate obtained by treating cupric solutions with hydrogen sulphide is  $\text{Cu}_2\text{S}_3$ , and not  $\text{CuS}$ , the latter being entirely unknown. John B. Coppock now records some experiments and gives analytical data which point out that cupric sulphide,  $\text{CuS}$ , can be prepared by the interaction of a copper salt and hydrogen sulphide, particularly when the copper salt is in excess. Whether the substance which comes down with the hydrogen sulphide under the usual conditions is  $\text{Cu}_2\text{S}_3$ , is under investigation. In the course of the present investigation the author found that when the cupric salt is in solution slightly acidulated with hydrochloric acid, and hydrogen sulphide is passed into the solution, a certain proportion of free sulphur is always thrown down and therefore prevented the preparation of a pure precipitate, whether it was  $\text{Cu}_2\text{S}_3$  or  $\text{CuS}$  which came down. But if an excess of copper salt was added to a solution of hydrogen sulphide in water, of known strength, and no added acid, the precipitate was composed of the true cupric sulphide,  $\text{CuS}$ .—*Chem. News*, June 5, 1896, 262.

*Copper Sulphate—Detection of the Presence of Iron.*—Mathieu observes that if to a solution of 1 Gm. of cupric sulphate in 10 Cc. of water, a few drops of a 10 per cent. sodium salicylate solution are added, the solution acquires a moss-green color, which, in the presence of small quantities of iron, become brown upon the addition of 0.5 to 1 Gm. of potassium chlorate, and boiling a few minutes. An immediate brown color upon addition of sodium salicylate is indicative of a large percentage of iron. In the absence of iron the solution retains its green color under all the conditions mentioned.—*Pharm. Centralh.*, Oct. 10, 1895, 584.

*Lead—Volumetric Determination.*—A. S. Cushman and J. H. Campbell describe a modification of Schwartz's method, which they consider of value for the volumetric determination of lead. The lead is precipitated as sulphate, ammonia added, then a slight excess of acetic acid, after which the mixture is boiled until the lead sulphate is dissolved. A filter is moistened with ammonia, the liquid passed through, and the filter washed, first with



water containing ammonium acetate in solution, and finally once or twice with hot water. The filtrate is then cooled, and from a burette an excess of standard dichromate solution is run in, stirring until the precipitate settles rapidly and the supernatant liquid has a yellow color. It is then allowed to settle for a few minutes, filtered under pressure, washed a few times, and the filtrate titrated against standard solution of ammonio-ferrous sulphate. It is stated that, after a little practice, the method can be carried out as detailed in about thirty minutes, and that, while the results are a trifle low, the mean amount of lead recovered in twenty determinations was 99.6 per cent. of that taken.—Pharm. Journ., Febr. 29, 1896, 162; from Journ. Amer. Chem. Soc., xvii, 901.

*Lead—Treatment of Poisoning by Sodium Monosulphide.*—Dr. Peyron gives his results in the treatment of lead poisoning by sodium monosulphide. He gives this salt in doses of 30 to 40 centigrams, either dissolved in glycerin or in pills. The eliminating properties of this salt, as regards lead, are far greater than those of potassium iodide, which has hitherto enjoyed the highest reputation.—West. Drug., May, 1896, 209; from *Progres Médical*, through N. Y. Therap. Review.

#### TIN.

*Tin—Quantitative Estimation.*—Cecil J. Brooks, as the result of recorded experiments made to ascertain the cause of the low results often obtained in the determination, recommends the following method as yielding fairly constant results: The acidulated hydrochloric solution is oxidized with bromine, hot hydrosulphuric acid is added, and the gas passed. The precipitated sulphide is washed, dissolved off the filter with ammonium sulphide, the solution evaporated in a weighed basin to a convenient bulk, oxidized with nitric acid, and the residual stannic oxide dried, ignited, and weighed. In the recorded experiments 0.4495 and 0.4519 Gm. of stannic oxide were so obtained from 50 Cc. of a standard solution containing 0.4508 Gm., while a direct experiment upon 0.25 Gm. of tin yielded stannic oxide corresponding to 0.2490 Gm. of the metal.—Chem. News, May 8, 1896, 218-219.

*Tin Sulphophosphide—A New Crystalline Compound.*—A. Granger describes crystalline tin sulphophosphide as being a blackish-gray substance, insoluble in hydrochloric, nitric, and nitro-hydrochloric acids, but readily dissolved, when in fine powder, in a solution of potassa or soda through which a current of chlorine or bromine is being passed.

*Tin Haloid Salts.*—Action of *Nitrogen Peroxide*, which see under "Nitrogen."

#### TUNGSTEN.

*Paratungstic Acid—Question of Existence.*—L. A. Hollopear states that it is easy to obtain solutions of paratungstic acid presenting all the

known reactions of the paratungstates, and becoming converted into metatungstic acid on ebullition, just as the paratungstates are converted into metatungstates. Paratungstic acid therefore really exists, as Laurent maintained, but the little stability of its molecule caused it to be split up into tungstic acid and water as the simple concentration of its solutions. This alone distinguishes it from Graham's colloidal tungstic acid, which may be evaporated to dryness and heated to  $200^{\circ}$  without decomposition.—Chem. News, Aug. 2, 1895, 61; from Compt. rend., July 1, 1895.

## MOLYBDENUM.

*Molybdenum—Preparation and Properties of the Pure Melted Metal.*—Molybdenum, which has heretofore been obtained by Debray in a fused condition in the form of small globules containing 4 to 5 per cent. of carbon, has now been obtained by Henri Moissan in a pure fused condition and in quantities. Starting with pure ammonium molybdate, this is reduced to powder, placed in a crucible of refractory earth, capable of holding 1 kilo, covered with its lid, and heated for one and a half hours in a Perrot furnace. After cooling the dense violet-gray powder of oxide ( $\text{MoO}_3$ ) is mixed with 10 per cent. of sugar-charcoal; the mixed powder is heaped up in a crucible of coke and submitted to the action of an arc produced by a current of 800 ampères and 60 volts for *six minutes*. If this time is exceeded, the fused molybdenum is completely liquefied, corrodes the crucible, becomes carburetted, and a gray cast metal, very hard and brittle, is obtained. Complete fusion must, therefore, be avoided, so that a solid layer may remain in contact with the crucible. With the proper observation of these necessary conditions it is easy to prepare more than a kilo of the metal in one hour. The gray cast molybdenum is very hard, scratching steel and quartz, and containing from 5 to 5.5 per cent. of carbon. A white molybdenum, containing 12.5 per cent. carbon, is also described.

*Pure Fused Molybdenum*, obtained under the above-mentioned conditions, has a sp. gr. of 9.01. It is a metal as malleable as iron, can be easily filed and polished, and forged hot. It does not scratch either quartz or glass. When free from carbon and silicon, it scarcely oxidizes in the air below a dull redness. At about  $600^{\circ}$  it begins to be oxidized, and yields molybdic acid, which is slowly volatilized. If heated in a mass of charcoal to a temperature close on  $1500^{\circ}$ , it becomes cemented, takes up a small quantity of carbon, and its hardness increases so that it can scratch glass; if it is then heated to  $300^{\circ}$ , and plunged suddenly into cold water, it is tempered, becomes brittle, and hard enough to scratch rock crystal. It is, inversely, easily decarburated, a property which the author considers to be due to the ready diffusion of the vapors of molybdic acid through the metal. He regards this of considerable importance in certain metallurgic operations, to which he calls attention.—Chem. News, July 5, 1895, 2-3; from Compt. rend., cxx, 1320.

*Molybdenum—Properties of the Metal and its Amalgam.*—J. Ferée states that the properties of molybdenum obtained from its amalgam by distillation *in vacuo* at a low temperature are quite different from those of molybdenum as hitherto obtained. The substance is pyrophoric, ignites in the air, yielding molybdic oxides, which are partially volatilized by the heat liberated, but it loses this property if heated above  $400^{\circ}$ . It becomes incandescent in a current of sulphurous acid, which is entirely absorbed, forming molybdenum sulphide and molybdic oxides. Nitrogen, carbonic acid, and hydrogen sulphide seem to have no action at the ordinary temperature or at a gentle heat. Carbon monoxide is rapidly decomposed.—Chem. News, April 17, 1896, 186; from Compt. rend., Mar. 23, 1896.

*Molybdic Acid—Acidimetric Determination.*—Karl Seubert and W. Pollard, while engaged in the analysis of hydrated molybdic acid which had crystallized out of a molybdenum solution, made the experiment of determining the proportion of free acid in the precipitate by supersaturation with soda lye and titrating back with hydrochloric acid, using phenolphthalein as indicator. The results were satisfactory. Various indicators were used, but only phenolphthalein and litmus proved satisfactory. The lye must be carefully prepared, and should be preserved from carbonic acid.—Chem. News, Dec. 13, 1895, 293; from Zeitschr. f. Anorgan. Chem., viii. parts 4 and 5.

#### ARSENIC.

*Arsenic—Separation from other Elements by means of Methylic Alcohol and Hydrochloric Acid.*—The method of separating arsenic from other elements by converting it into a volatile trichloride, proposed by Schneider and by Fyfe, which has been variously improved upon by E. Fischer, by Hufschmidt, Classen, and Ludwig, depends, in its most recent improved form, upon the elimination of the arsenic in the presence of ferrous chloride and of gaseous hydrochloric acid. Carl Friedheim and Paul Michaelis now propose to substitute methylic alcohol for the ferrous chloride, which is not alone expeditious and certain, but enables the separation of the arsenic from certain elements—tungsten, vanadium, molybdenum, etc.—from which it cannot be separated with advantage in the presence of the ferrous salt. The authors find that arsenic acid, on treatment with methylic alcohol and hydrochloric acid, is not esterified as such, but reduced to arsen-trioxide, which then seems to evaporate in the form of its ester. If the methylic solution of arsenic acid (0.2 to 3 Gm.  $\text{As}_2\text{O}_3$  in 40 to 50 Cc. of the alcohol), saturated with hydrochloric acid, is heated in a distillation flask on the water-bath, arsenical vapors are given off at  $40^{\circ}$  to  $50^{\circ}$  (thermometer in the flask), the main quantity following at  $65^{\circ}$  to  $90^{\circ}$ . A repetition of the operation yields only small quantities of arsenic, and on a third distillation the contents of the flask and the distillates in the receiver are usually free from arsenic.

The distillate is collected in a receiver containing concentrated nitric acid, whilst a current of hydrochloric acid gas is passed through the apparatus continuously, a weak current being also passed during the recovery of methylic alcohol from the distillate : the process being made continuous by the return of the methylic alcohol to the distillatory flask until its arsenical contents have completely passed into the receiver. The contents of the receiver are then treated with a further quantity of concentrated nitric acid in a capacious capsule, finally heated in a water-bath, and brought, after the addition of more nitric acid, to complete dryness. The dry residue is taken up with water, filtered, and precipitated with magnesia mixture in a well-known manner.

The authors give a detailed description of the apparatus as well as of the method, and also the modification of the method that becomes necessary when arsenic is to be separated from vanadic acid, from molybdic acid, and from tungstic acid, for which reference may be had to the original paper, as translated in *Chem. News*, Oct. 18, 1895, 191-192 ; from *Berichte*, xxviii, 1414.

*Arsenic—Precautions Respecting the Official Test of the Germ. Pharm.*—Geissler calls attention to the liability of error when testing for arsenic by the method directed in the German Pharmacopœia, due to the deterioration of the solution of stannous chloride. If upon opening the container of this reagent fumes are not given off, the hydrochloric is no longer present in sufficient excess, and the results of the determination become uncertain. The author expresses the hope that in a new edition the present method of detecting arsenic will be replaced by one depending upon the generation of arsenuretted hydrogen.—*Pharm. Centralh.*, October 17, 1895, 591.

*Arsenic—Determination in Organic Substances.*—Ishevisky and Nikitin recommend the following process for the determination of arsenic in organic substances : The substance is treated with boiling concentrated sulphuric acid with the addition of cupric oxide, the process requiring several hours for the complete destruction of the organic matter, during which, however, none of the arsenic is volatilized. The solution is then mixed with potassium permanganate in small excess to remove the sulphurous acid that has been formed, and the arsenic may then be determined in the usual manner in a Marsh's apparatus.—*Pharm. Centralh.*, Nov. 7, 1895, 646 ; from *Pharm. Zeitschr. f. Russl.*, 1895, 580.

*Arsenic—Delicate Test.*—A. Carnot describes a delicate test for arsenic, which depends on the formation of arsenate of bismuth— $\text{As}_2\text{O}_3 \cdot \text{Bi}_2\text{O}_3 + \text{H}_2\text{O}$ —the arsenic being precipitated as sulphide, the precipitate converted by means of ammonia, silver nitrate, and hydrogen dioxide into arsenic acid, and finally determined as arsenate of bismuth, which is very insoluble in dilute nitric acid, and of which the weight is about five times the weight

of the arsenic it contains. The precipitate should be simply dried, and not calcined before weighing. The method was found to be both certain and exact.—Pharm. Journ., July 27, 1895, 74; from Compt. rend., cxxi, 20.

*Arsenic—Use of Thio-Acetic Acid for its Toxicological Determination.*—See *Thio-Acetic Acid*, under "Organic Chemistry."

#### MERCURY.

*Mercury—Simple Device for Measuring Definite Quantities.*—H. Král calls attention to a simple device for measuring mercury in operations in which approximately identical quantities of the metal are required, as, for instance, in the Kjedadl-Wilfarth method of determining nitrogen. It consists of a goose-quill, into which the necessary quantity of mercury has been weighed. A small hole is then cut immediately above the surface of mercury, and the apparatus is ready for use. By simply immersing it into the mercury, it is filled through the opening, and uniform quantities, sufficiently accurate for practical purposes, are thus easily measured.—Pharm. Centralh., July 25, 1895, 422, 423.

*Mercury—Simple Determination in Urine.*—Jolles recommends the following simple method for the determination of mercury in urine: 100 Gm. of the sample are heated with 2 Gm. of granulated gold and a little stannous chloride. Mercury is liberated from its combination, and unites with the gold in "statu nascendi." The amalgam is washed, placed into a test tube with a little water, and 1 to 1.5 Cc. of freshly prepared solution of stannous chloride are now added. In the presence of mercury, if only in traces, a distinct turbidity is produced in the otherwise clear fluid. By this method 0.0002 Gm. of mercury in 100 Cc. of urine have been detected.—Pharm. Post., 1895, 509.

*Calomel—Sensitive Reaction for Corrosive Sublimate.*—A writer in "Monit. de la Pharm." (1895, 1696), communicates the following delicate reaction for determining the presence of mercuric chloride in calomel: To 0.1–0.2 Gm. of the calomel in a clean porcelain capsule, 1 drop of a 10 per cent. alcoholic solution of medicinal soap and 1 drop of freshly prepared 10 per cent alcoholic solution of guaiac resin are added, followed by 2 Cc. of ether, to dissolve the mercuric chloride; the mixture is then well stirred with a glass rod, and the ether allowed to evaporate, when, in presence of mercuric chloride, an intense green color is developed. The presence of 1:30,000 is thus revealed.—Pharm. Centralh., July 18, 1895, 410.

*Mercuric Chloride—Test for its Presence in Calomel.*—The following method for the detection of mercuric chloride in calomel is given in "Moniteur" (xlv., 1696): 2 or 3 grains of the calomel are mixed with a drop of 10 per cent. alcoholic soap solution and a drop of freshly prepared alcoholic solution of guaiac resin. The mixture is well stirred with 2 Cc.

ether, when, upon evaporation of the ether solution, the presence of mercuric chloride is indicated by the intense green coloration of the residue.—Pharm. Jour., July 27, 1895, 75.

*Mercuric Chloride—Value in the Treatment of Rhus Poisoning.*—Dr. A. F. Witmer calls attention to the rapid convalescence in a case of rhus poisoning by treatment with corrosive sublimate. The patient, who is very susceptible, direct contact with the plant not being necessary, has had yearly attacks of a severe type, frequently lasting for six weeks. In May he had the typical eruption on the face and fingers. He was given one thirty-second of a grain of corrosive sublimate every three hours, lead water and laudanum being applied during the acute stage, hot water frequently applied during the stage of exudation, and a two per cent. carbolic petrolatum ointment during the stage of desquamation. Within four days the eruption had entirely disappeared.—Amer. Jour. Pharm., Aug. 1895, 424; from Phil. Polyclinic.

*Mercuric Perchlorate—Preparation and Characters.*—M. Chikashigé has obtained mercuric perchlorate— $\text{Hg}(\text{ClO}_4)_2 \cdot 6\text{H}_2\text{O}$ —by saturating perchloric acid with mercuric oxide, evaporating the solution, and preserving the rectangular prisms over sulphuric acid. The crystals melt with decomposition at  $34^\circ$ , are very hygroscopic, but nevertheless with difficulty soluble in water, under partial liberation of acid and formation of basic salt—a condition which is also brought about by absolute alcohol. The *basic perchlorate*— $\text{Hg}_2\text{O}_2(\text{ClO}_4)_2$ , is a white, amorphous body, and results when the free acid and water of crystallization are evaporated at  $150^\circ$ .—Pharm. Centralh., April 9, 1896, 221; from Chem. Centralbl., 1896, 66.

*Mercurous Iodide—Action of Heat.*—Maurice François has studied the action of heat upon mercurous iodide, and finds that this compound cannot be melted without decomposing it, metallic mercury separating at the bottom of the vessel, while the supernatant mass is a mixture of mercurous and mercuric iodides. Neither the melting point nor the ebullition point can therefore be exact. Mixtures rich in mercuric iodide—2 molecules to 1 of mercurous iodide—can be melted without decomposition, but crystals of mercurous iodide free from mercuric iodide cannot be obtained by simple fusion, notwithstanding the fact that mercuric iodide has a lower solidification point than the mercurous compound. By removing the portion which remained liquid, crystals of mercurous iodide were obtained by fusion, which contained interposed variable quantities of mercuric iodide.—Chem. News., Feb. 21, 1896, 95; from Compt. rend., Jan. 27, 1896.

*Mercurous Iodide—Action of Alcohol.*—Maurice François finds that boiling alcohol decomposes mercurous iodide, the decomposition ceasing, however, when 100 grams of the liquid contain in round numbers 0.220 grams of mercuric iodide in solution. The reaction is reversible, and the inverse action stops at the same limit. The quantitative separation of

mercuric and mercurous iodide by means of alcohol is, therefore, not exact.—Chem. News, Jan. 3, 1896, 12; from Compt. rend., Dec. 9, 1895.

*Mercurous Iodide—Action of Phenol upon It.*—Maurice François finds that at the temperature of ebullition the decomposition of mercurous iodide by phenol is limited by the quantity of mercuric iodide existing in solution, the decomposition always ceasing when the liquid contains 2.75 per cent. mercuric iodide. In presence of metallic mercury, if a solution of mercuric iodide contains more than 2.75 per cent. of mercuric iodide, there is found mercurous iodide.—Chem. News, Dec. 20, 1896, 306; from Compt. rend., Nov. 25, 1895.

#### PLATINUM.

*Platinum—Successful Fusion.*—Victor Meyer remarks that in a memoir from the pen of H. Hecht, a thorough expert, it has been pointed out that the oft-repeated assertion of the fusibility of platinum in a furnace fed with carbon and air has not been incontrovertibly demonstrated. In the course of the pyro-chemical investigations which for some time have engaged Meyer, in concert with Dr. von Rocklinghausen and Dr. Locke, they have succeeded in constructing a fire-box in which by the heat of a furnace supplied with retort-graphite as fuel, and a very-powerful air blast, they have successfully fused platinum. They formed a block of perfectly refractory earth in which were two depressions, so that it might be regarded as a double crucible with very thick sides. In one of these depressions was laid a piece of sheet platinum, and in the other a sheet of metal of equal size of the alloy of 25 parts of iridium and 75 parts of platinum, which had previously proved to be considerably less fusible than platinum. The block was then perfectly closed by means of a top of the same refractory earth, so that the whole formed a massive stone-like mass with two cavities. On burning, the crucible thus formed was converted into a stone perfectly solid and hard, and after it had been heated in the graphite blast furnace, allowed to cool, and broken open, the platinum was found melted into a ball, but the platinum-iridium alloy was perfectly unaffected.—Chem. News, May 22, 1896, 235.

## ORGANIC CHEMISTRY.

### HYDROCARBONS.

(Including Volatile Oils.)

*Petroleum—Production in Java.*—The "London and China Telegraph" describes petroleum boring in Java as continuing to do well. In the districts around Sourabaya, the oil wells yield abundantly, and in Mid Java

the business has also been started with success. At first difficulties arose from inadequate means of transport, but pipe lines have now been laid from the wells to the neighboring tramway, and from these tank cars are filled for conveyance to Samarang, where it is proposed to establish warehouses with all necessary appliances.—Pharm. Journ., Sept. 28, 1895, 264.

*Mineral Oils—Fallibility of Royère's Test of Distinction from Animal and Vegetable Oils.*—Halpen has made experiments with Royère's decolorized fuchsine test and the results tend to discredit its value. The test consists in adding to a few drops of the suspected oil two drops of a solution of fuchsine which has been decolorized by the addition of sulphurous acid. If an animal or vegetable oil is present, a color should be developed. Since the appearance of the color is due to the presence of acid, there is a possibility of the results being misleading, as traces of acid are a frequent impurity in mineral oils. On the other hand, the presence of soap will counteract the action of the animal or vegetable oil.—Amer. Drug., April 10, 1896, 216; from Rep. de Pharm.

*Benzin—Commercial Quality.*—Wilson C. McClosky communicates the result of his examination of 23 samples of benzin, 18 purchased in pharmacies and 5 in paint stores. With three exceptions, all the samples had more or less the odor of petroleum, some of them slightly, others decidedly. All the samples were colorless and neutral to litmus paper, the test being made both directly upon the benzin and upon water shaken with it. Incidentally with this latter test the author found that some of the samples would dissolve a small quantity of the water, while in other cases water would dissolve a little of the benzin; whereas others again would neither dissolve water nor be dissolved (reduced in volume) by it. The most important observation was in reference to their specific gravities and boiling points. The U. S. P. assigns to benzin a sp. gr. of 0.670 to 0.675 at 15° C., and a boiling point of 50° to 60° C. None of the 18 samples from the pharmacies came up to these requirements, the lowest sp. gr. observed being 0.6811, the highest 0.7273, no correction for temperature being considered necessary, because all specific gravities were higher than 0.675, at varying temperatures above. The boiling points (initial) ranged from 64° to 106° C., and in the instance of one of the samples obtained from the paint stores was as high as 149° C. On the other hand, among these latter samples, the author found the only one that corresponded to the requirements of the U. S. Pharmacopœia, its sp. gr. being 0.672, and its initial boiling point 50° C. The detailed results may be consulted in the table appended to the author's paper.—Am. Jour. Phar., July, 1895, 364-367.

*Metadichlorobenzene—Method of Production in Quantities.*—Metadichlorobenzene, although well known, is extremely costly and difficult to procure. Frederick C. Chattaway and R. C. T. Evans, requiring large quantities of this compound, and there being no direction for preparing it



in quantity available, have worked out a simple and very satisfactory method for obtaining it easily in bulk: Acetanilid, dissolved in hot acetic acid, is treated with a thin paste of bleaching powder until two hydrogen atoms, occupying the meta-position with respect to one another, are replaced successively by chlorine. A heavy liquid addition product of hypochlorous acid and the 1:3:4-dichloroacetanilid is produced, which sinks on cooling, is easily separated, and when treated with hot alcohol is rapidly decomposed, 1:3:4-dichloroacetanilid crystallizing out. This is then heated with strong sulphuric acid, which hydrolyzes it, and on pouring the solution over ice 1:3:4-dichloraniline separates. The dichloraniline, dissolved in a large quantity of alcohol, is then mixed with an excess of hydrochloric acid and deazotized by sodium nitrite, when, as the temperature rises from the reaction, the di-azo group first formed is replaced by hydrogen. The amount of metadichlorobenzene thus obtained is over 50 per cent. of the weight of acetanilid taken.—Chem. News, May 15, 1896, 229.

*Naphthalin—Use as a Vermifuge.*—Schmitz employs naphthalin for the expulsion of *Oxyuris Vermicularis*. He gives it in eight or ten successive doses of  $\frac{1}{4}$  to  $\frac{1}{3}$  grain, in powder, four times daily, after a few evacuations have first been produced by administering a cathartic. The treatment is repeated after a week, and if needful at another week's interval. The drug should not be given after eating.—Pharm. Journ., April 18, 1896, 307; from Wien. Med. Press.

*Beta-Naphthol Bismuth.—Composition and Medicinal Advantages.*—The recognized value of naphthol in cases of intestinal diseases due to abnormal fermentations is mitigated to some extent by its acrid taste, which has hitherto prevented its application in cases of children; but Ed. Chaumier, having found that the naphthol is more acceptable in combination with bismuth, proposes a compound composed of 26.5 p. of  $\beta$ -naphthol and 73.5 p. of bismuth subnitrate. This compound is completely soluble in the intestines and has a not unpleasant taste, so that it is readily taken and may be prescribed for children.—Pharm. Centralh., Dec. 26, 1895, 747; from Congr. de Med., de Bordeaux, 1895.

*Acetylene—Combustion.*—H. Le Chatelier finds that mixtures of acetylene with air containing a proportion of the gas below 7.74 per cent., burn with a yellowish, feebly luminous flame, and yield carbonic acid and water. With proportions of acetylene between 7.74 and 17.37 per cent., the flame is of a pale blue with a slight yellowish halo, and the products of the combustion are carbon dioxide, carbon monoxide, water, and hydrogen. If acetylene is burnt with an equal volume of oxygen, it gives a temperature of 4000°, which is superior to the oxyhydrogen flame by 1000°, and consequently of great technical importance. The products of combustion in the latter case consist exclusively of carbon monoxide and hydrogen.—Chem. News, Jan. 24, 1896, 47; from Compt. rend., Dec. 30, 1895.

*Acetylene—Decomposition by Pyrophori.*—H. Moissan and C. Mouren find that "pyrophori," prepared by reducing iron, nickel, or cobalt, by hydrogen at the lowest temperature possible, will decompose acetylene in the cold with incandescence and the production of carbon, hydrogen, and carbides. The decomposition appears to be the result of a similar physical phenomenon to that observed in the case of the platinum black, being due to the porosity of the metals.—Pharm. Journ., June 27, 1896, 501; from Compt. rend., cxxii, 1240.

*Acetylene—Toxicity.*—M. Gréhan infers from his experiments that acetylene is poisonous, if inhaled in large quantities. It is, however, much less poisonous than coal gas. Its mixtures with oxygen are highly explosive.—Chem. News, Nov. 8, 1895, 233; from Compt. rend., Oct. 21, 1895.

*Acetylene—Toxity.*—L. Brociner states that acetylene exerts merely a very feeble poisonous action, no more marked than that of ordinary hydrogen carbides, such as formene, ethylene, or propylene. Animals exposed to the action of mixtures containing considerable proportions of acetylene for several hours, do not succumb if care is taken to operate in presence of a considerable quantity of oxygen, and if the gaseous mixture is renewed so as to prevent the products of the animal's respiration from accumulating.—Chem. News, Dec. 20, 1896, 306; from Compt. rend., Nov., 1895.

*Volatile Oils—Detection of Adulteration with Gurjun Oil.*—Ed. Hirschsohn, having been advised that volatile oils are occasionally adulterated with the volatile oil of gurjun balsam, has examined a large number of volatile oils with the view to determine their reaction with stannous chloride, which produces a red color when boiled with gurjun balsam or oil. He found that the pure oils of valerian, patchouly and sumbul give a very similar reaction to gurjun oil, while the reaction with cardamom, cubeb, galanga, bay-leaf, pepper, sandal and celery oils are not quite so similar in their reaction. The other oils produce distinct color reactions. Many commercial oils were found to be adulterated with gurjun oil.—Pharm. Centralh., June 25, 1896, 396; from Pharm. Zeitsch. f. Russl., 1896, Nos. 5, 6.

*New Fragrant Volatile Oils*—Two new volatile oils for use in perfumery are described in "Hänsel's Quarterly Report." The first,

*Frejar Oil*, is made from a fragrant wood—botanical name not given—and constitutes in the crude condition a somewhat thick liquid, sp. g. 0.9293, which becomes colorless on rectification, losing 20 per cent. of resinous matter, and having a sp. g. 0.9065 at 15° C. The second,

*Nagkessar Oil*, is distilled from the flower of *Mesua salicina*, Planch., but the yield from the imported dried flowers, which were used by Mr. Hänsel for its production, is so small that its present price is prohibitive. The perfume is described as very fragrant, somewhat allied to that of the

violet, but not exactly comparable with that of any known oil. It may possibly be worth the while of an East Indian plantation to produce the oil from fresh flowers.—Pharm. Jour., Feb. 8, 1896, 113.

*Oil from Tsuga Canadensis*, Carriere—*Chemical Examination*.—Bertram and Walbaum having reported on the composition of an oil called by them "*Canadisches Tannenoel*," or spruce oil, and supposed to be derived from *Abies canadensis*, L., Carl G. Hunkel, quoting as authority Dr. F. B. Power, calls attention to the fact that "true oil of spruce" is obtained from *Picea nigra*, Link. Mr. Hunkel has now distilled the volatile oil from the leaves and twigs of the "true hemlock," *Tsuga Canadensis*, Carriere, better known in pharmaceutical literature as *Abies Canadensis*, Michaux, collected in September, and finds it to consist principally of about equal parts or *lævogyrate* bornyl acetate and l-pinene. The oil possessed a yellowish color, and the characteristic odor of hemlock and a sp. gr. of 0.9288 at 20°. Other substances than those named may be present in the oil in small quantity, but they could not be isolated from the quantity of material available for the present examination. There certainly is a small quantity of a strong odoriferous substance present which gives to this *Oil of Hemlock* its peculiar odor, and which distilled over at least in part with the bornyl acetate when the oil was fractioned under diminished pressure. The author's experiments, however, show that this oil of hemlock is very similar in composition to that examined by Bertram and Walbaum, as well as to the oil of black spruce—*Picea nigra*, Link—examined and reported on by the author last year (see Proceedings 1895, 1037).—Pharm. Rundschau, Feb. 1896, 34-36.

*True Oil of Scotch Fir (Pinus sylvestris)*—*Character*.—John C. Umney, in continuation of a recent paper on the principal essential oils, records in some detail the experiments made with a view to explaining the differences observed in commercial oils designated as *ol. pini sylvestris*. He distilled about 3 cwt. of the young leaves and cones of true Scotch fir (*Pinus sylvestris*, Linn.), gathered in June, obtaining less than ½ per cent. of essential oil, of a pale greenish-yellow color, highest characteristic odor, and a taste that distinctly recalls that of blackberries. From the results of his experiments, and a comparison with those of Bertram and Walbaum, who also operated upon oil of undisputed source, the author arrives at the conclusions that (1) the rotation of true oil of Scotch fir may differ, either according to the period of the year at which the material for distillation has been collected, or to the conditions of climate and soil under which the fir has grown; although it should not exceed 20° in either direction in a 100 Mm. tube. (2) That the specific gravity of the oil should not fall below 0.880 at 15° C. (3) That a very considerable portion should distill above 185° C. (4) That not more than 15 per cent. should distil below 15° C. The author, in the course of his examination of the true oil of *Pinus sylvestris*, found it necessary to experiment with other pine oils.

*Oil of Abies Canadensis* (spruce oil), had a sp. gr. of 0.9026 at 15° C., and a rotation of—25 in a tube of 100 Mm. Its odor was quite different from that of oil of Scotch fir.

*Oil of Abies Excelsa*, from the young cones, now frequently offered as "genuine pine-needle oil," has a much lower sp. gr. (0.855 to 0.865 at 15° C.), than the true oil, and is laevo-rotatory to the extent of about —70° in 100 Mm. tube.

*Oil of Picea Vulgaris*, distilled for the author in Germany, has the most pleasant odor of all the pine oils examined by him. It was yellowish in color, sp. gr. 0.8806, rotation —37° in 100 Mm. tube.

*Oil of Pinus pumilio*, (Mountain Pine), as met with in trade, possesses fairly constant characters. The sp. gr. ranges between 0.865 and 0.870 at 15° C., which is slightly lower than that recorded by Bertram and Walbaum. A sample selected for examination had a sp. gr. of 0.8694 at 15° C., and an optical rotation of —7.5 in 100 Mm. tube.—Pharm. Journ., Aug. 24, 1895, 161–173; from Proc. Brit. Pharm. Conf., 1895.

In continuation of his investigations on the oil distilled from *Pinus sylvestris*, Mr. Umney has examined the oil obtained by distilling a further quantity of the leaves during the month of December, in order to determine how far the rotation of this variety of pine oil was influenced by the season of the year and consequent age of the leaves. He found that although the oil differs slightly from that distilled in June, it comes within the limits stated in his previous paper, and is decidedly lævo-rotatory, though not to such an extent as the oil distilled in June. The yield also is much smaller from the December leaves, viz., 4¾ ozs. (=0.133 per cent.) from 2 cwt. His results confirm the characters previously suggested, viz., limit of optical rotation, specific gravity, and percentages distilling below 170° C. and above 185° C. respectively.—Pharm. Jour., Dec. 28, 1895, 542.

*Oil of Turpentine—Commercial Quality.*—The following results of an examination of fifteen samples of oil of turpentine, representing several hundred barrels of the commercial article, show remarkable uniformity in characteristics, a single sample only being insoluble in three parts of alcohol, this solubility being one of the requirements of the Pharmacopœia for the two different grades of oil of turpentine official.

No.	Sp. Gr.	Boiling Point = °C.	Solubility in Three Parts of Alcohol.	No.	Sp. Gr.	Boiling Point = °C.	Solubility in Three Parts of Alcohol.
1	0.8598	153°	Soluble.	9	0.8580	154°	Soluble.
2	0.8578	150°	Insoluble.	10	0.8558	155°	do
3	0.8589	150°	Soluble.	11	0.8601	155°	do
4	0.8670	153°	do	12	0.8587	155°	do
5	0.8673	153°	do	13	0.8565	154°	do
6	0.8600	152°	do	14	0.8592	154°	do
7	0.8590	152°	do	15	0.8540	155°	do
8	0.8550	155°	do				

The average sp. gr. of the fifteen samples is shown to be 0.8591, and the average boiling point is 153° C.—Proc. Pennsylvania Phar. Assoc., 1895, 97.

*Oil of Lemon—Rational and Scientific Basis for its Valuation.*—Henry Garnett communicates a paper on the outcome of an endeavor to place the valuation of the oil of lemon on a more rational and scientific basis than has hitherto been possible. While the specific gravity, its optical relations and fractional distillation are doubtless of value, it is upon the determination of the character and quantity of the chemical constituents that we must depend for a proper valuation of the oil. By far the greater part of the lemon oil consists of the hydrocarbon *limonene*, together with probably a very little *pinene*, and a small percentage of a non-volatile stearopten, but the distinctive aroma of the oil is due to the presence of an aldehyde, *citral*, first discovered to be present by Schimmel & Co. It is true that pure limonene—free completely from citral—still retains an agreeable lemon-like odor, and it is certain that a solution of pure citral in alcohol fails to recall entirely the odor of fresh lemon; but the author emphasizes, as has been repeatedly done by Schimmel and Co., that a quantitative determination of citral is the sole reliable evidence of the value of lemon oil. Unfortunately, no working process for this determination has heretofore been given, and the author, therefore, proposes such a process in his present paper. This process is founded upon the fact that just as geraniol yields its aldehyde citral on oxidation, so citral can, by a process of reduction, be converted into geraniol. Without going into details, which must be referred to in the original paper, the process is briefly as follows: To about 25 Cc. of the lemon oil, dissolved in a little more than its volume of glacial acetic acid in a 200 Cc. flask, about 5 Gm. metallic sodium, cut in small pieces, is gradually added, regulating the addition so that the heating produced by the reaction may not cause actual boiling. When the reaction is completed, the contents are diluted with water, the oil is well washed, separated, and dried with anhydrous sodium sulphate in contact over night. The "geraniol" which has thus been produced in the oil by the reduction of the citral, is next acetylated by Lieberman's method, by boiling the

dried oil with about one-third to one-half its volume of acetic anhydride, and one-tenth part of anhydrous sodium acetate, in a flask connected with a reflux condenser, for about two and a quarter hours, allowed to cool, heated with water on a water-bath to drive off excess of anhydride, and washed in a separator until it becomes neutral to litmus. After drying the oil so obtained, the "acetic-ester of geraniol" that has been formed is determined by decomposing a weighed quantity of the acetylated oil with normal or semi-normal alcoholic potash solution, boiling for a half hour under a reflux condenser to complete saponification, adding water, and determining the excess of alkali used by titration with standard acid; the difference gives the amount of alkali absorbed by the oil, and from the figures obtained the percentage of citral in the original oil is calculated by a given formula. This process has been applied to lemon oils of good quality, with the following results:

Sample.	Sp. gr. at 15°5.	Rotation 100 Mm.	Citral, per cent.
1.....	.8572	+62°35'	6.72
2.....	.8588	+58°38'	7.07
3.....	.8581	+62°30'	6.92
4.....	.8582	+62°18'	6.49

These samples, obtained from first-class houses, are probably absolutely pure oils. The second sample is remarkable as having an abnormally low rotation, yet the citral percentage comes out slightly higher than in any of the others.—Pharm. Jour., April 25, 1896, 323-324.

*Oil of Lemon—Method of Restoration when Old.*—B. W. Kelling records some experiments made with the view to establishing a method for the restoration of old oil of lemon which has become terebinthinate by oxidation. He finds that when such an oil is shaken with a saturated aqueous solution of potassium permanganate, and then distilled, the terebinthinate odor is completely removed. It may then be restored to a useful condition by adding about 7.5 per cent. of citral, the odorous principle of lemon oil, which is now an article of commerce.—Proc. Kansas Pharm. Assoc., 1895, 79-83.

*Bergamot Oil—Determination of Linalool Ester Present.*—Messrs. Schimmel & Co. (Report, October, 1895, 24) state that they have frequently had occasion to observe that the saponification process recommended by Helbing yielded higher results when applied to oils of bergamot than the process adopted by them. The difference in the *modus operandi* of the two processes is that Helbing heats the oil for two hours at 100° C. in a closed vessel, (*i. e.*, under pressure) with 10 per cent. alcoholic potash, whereas by the method of Schimmel & Co. (which is probably

the one generally used), the oil is heated on a water bath, in an open vessel provided with a return condenser, and with 2.8 per cent. alcoholic potash. Analytical data are given which show that by Helbing's modification the amount of *linalool-ester* in bergamot oil is uniformly higher to the extent about 1.8 per cent., a result which they maintain is due to the stronger alkali employed and to the heating under pressure. They, furthermore, find that by their process, with the weaker alkali and in open vessels, the saponification process is completed in as short a time as 10 minutes, and that while prolonged heating up to 2 hours does not appear to have any injurious effect, it is sufficient to keep the vessels on the water-bath between 15 and 30 minutes in order to obtain accurate results.

Referring to the foregoing observations of Messrs Schimmel & Co., H. Helbing and Dr. F. W. Passmore record the results of some experiments made with the view to determine in how far the strictures made were justified. From these experiments it appears that it is not so much the stronger alkali that causes the decomposition of the linalool—and the consequent higher per centage observed—but the higher temperatures reached in the closed vessels. On the other hand, they find that ten minutes heating on the water bath with the weaker (semi-normal) alcoholic potash is not always sufficient to completely hydrolyze the ester in bergamot oil, and that it is proper to continue the heating beyond fifteen minutes. They confirm that the heating should be done in open vessels with return condenser, and propose that it should be so continued for half an hour, using semi-normal alcoholic potash, as is done by the chemists of Schimmel & Co.—Chem. and Drugg., Oct. 19, 1895, 585.

*Otto of Roses—Difficulty to Obtain Pure Samples.*—It is stated in a recent consular report that the prohibition imposed by the Government on the importation into Bulgaria of essence of geranium, the chief adulterating medium for otto of roses, has hardly had any effect to check the practice. Last summer the British Chamber of Commerce at Constantinople sent a delegate to Kisanlik with the view to procuring an absolutely pure sample to serve as a standard for purposes of comparison. He returned empty-handed, for he ascertained that though otto of roses may not be tampered with after reaching the merchant's hands, there is no means of ensuring that the peasant has not already adulterated it. Supervision during distillation is no guarantee, for the ingenious peasant is in the habit of sprinkling essence of geranium over the freshly gathered roses.—Pharm. Journal, Aug. 31, 1895, 180.

*Rhodinol—Identity of this Rose-oil constituent with the principal constituent of oil of Pelargonium odoratissimum.*—The chemical identity of the alcohol—rhodinol—constituting the principal liquid constituent of rose oil, with the alcohol in various other oils, was announced some time ago by Bertram and Gildermeister, and confirmed later by Erdmann and Huth. Ph. Bartier and L. Bouveault now re-assert the identity of the alcohol con-

stituting the chief portion of the essential oil of *Pelargonium odoratissimum* with the rhodinol extracted by Eckart from essence of roses. They claim, however, that the product extracted by them from essence of pelargonium is really a mixture of lemonol and another alcohol, and declare that the rhodinol of Eckart is a mixture of the same two alcohols. The authors propose to retain the name rhodinol, formerly applied to its mixture with lemonol, to the pure alcohol obtained by them. The "new" rhodinol is described as a colorless oily liquid, boiling at  $110^{\circ}$  C. under a pressure of 10 Mm., possessing an agreeable odor of roses, and having a density at  $0^{\circ}$  C. of 0.8731. Its composition is represented by the formula  $C_{10}H_{18}O$ . It exists in the two essences examined—rose and pelargonium—to the estimated amount of 20 per cent.—Pharm. Jour., March 28, 1896, 421-422; from Compt. rend., cxxii, 529.

*"New" Rhodinol—Constitution.*—By oxidation of the "new" rhodinol described in their paper above, Barbier and Bouveault have obtained an aldehyde, having a strong odor of mint and corresponding apparently to the formula  $C_{12}H_{18}O$ , which they name "rhodinal." This aldehyde was associated with an oily monobasic acid—"rhodinic acid,"  $C_{10}H_{18}O_2$ —which possesses a strong and disagreeable odor, boils at  $147^{\circ}$ , and is identical with a product of the oxidation of rhodinol from pelargonium oil, to which the formula  $C_{10}H_{18}O_2$  was wrongly attributed at the time it was described. A third product of the oxidation of the new rhodinol is a neutral oil,  $C_{20}H_{36}O_2$ , which also possesses a disagreeable odor, boils at  $190^{\circ}$ , and is the "rhodinate of rhodinyll," a compound which is easily split up into rhodinol and potassium rhodinate by the action of alcoholic potash. Pursuing their investigations upon the aldehyde

*Rhodinal*, which has been referred to as having a very strong odor of mint, the authors observe in another paper that they find rhodinal to be in reality a mixture of "true rhodinal" and "menthone." The presence of menthone in the oxidation products of rhodinol naturally suggests that the latter may have been mixed with menthol; but this is disproved by the absence of menthol odor in the rhodinol, and a difference of  $20^{\circ}$  between the boiling points of the two alcohols, so that the presence of menthol should have been readily apparent. It seems more probable, therefore, to the author that the menthone was formed by isomerization of rhodinal, and they claim to have effected such a change experimentally.—Pharm. Jour., May 2, 1896, 341; from Compt. rend., cxxii., 673 and 737.

*Geranyl Dihydrochlorate—Composition, etc.*—A. Reyckler confirms Barbier's statement that the body  $C_{10}H_{17}Cl$  cannot be isolated, and that "geraniol" reacts with two molecules of hydrochloric acid to form a liquid dihydrochlorate,  $C_{10}H_{18}Cl_2$ , which, when decomposed by means of boiling solution of potassium acetate, yields dipentene. The geraniol used in the experiments was prepared by Schimmel from citronella oil. It readily absorbed gaseous hydrochloric acid, 40 Gm. taking up 22.4 Gm. of acid,



but part of the latter was removed by washing with dilute sodium carbonate solution. Analyses proved that 40 Gm. of the alcohol had combined with 18 Gm. of acid, theory requiring 18.9 Gm. The author also confirms the observation of Eckart that the whole of the chlorine could be removed from the geranyl dihydrochlorate by boiling it for two and a half hours with alcoholic potash solution, geraniol being thus regenerated.—Phar. Jour., May 2, 1896, 342; from Bull. Soc. Chim. (3), xv., 364.

*Rhodinol, Geraniol and Reuniol—Identity.*—The three commercial substitutes of oil of rose, designated by the name of "rhodinol" derived from French oil of geranium=*Pelargonium odoratissimum*), "geraniol" (derived from palmarosa oil (*Andropogon Schoenanthus*) and citronella oil and "reuniol" (derived from the geranium oil produced on Reunion), have been subjected to examination by Erdmann and Huth, who find the three oil products to be identical in their character and composition, in contradiction to the claim that "reuniol" is a new terpene alcohol and distinct from geraniol. The identity of the three bodies was established by the successful preparation from all of them of well crystallized derivatives of rhodinol. For this purpose urethanes were found the most suitable on account of the ease with which they are obtained in well defined crystals. They obtained the *diphenylurethane rhodinol* very readily from geraniol, rhodinol and reuniol, forming in each case silky glistening needles, melting at 84°, and having the composition corresponding to the formula  $C_{28}H_{37}NO_2$ .—Pharm. Centralh., Jan. 23, 1896, 45; from Pharm. Ztg., 1895, 846.

*Boldol—Use in Gonorrhœa.*—According to Gehe and Co. (Report, Sept. 1895), the demand for boldol, obtained by fractioning the volatile oil of boldo, has become quite lively as a remedy in the treatment of gonorrhœa. It is given in doses of 5 to 10 drops three times daily. It is occasionally used in Germany for the treatment of liver trouble, but is said to have been found useful in tropical South America, where abscesses of the liver are of frequent occurrence.—Pharm. Centralh., Sept. 12, 1895, 523.

*Essential Oil of Valerian—Constituents.*—According to Oliviero, oil of valerian contains a dextro-rotatory terpene, camphene, and citrene; formic, acetic, butyric and valerianic acids; a laevo-rotary borneol, terpineol, and sesquiterpene,  $C_{30}H_{48}$ ; an alcohol,  $C_{30}H_{48}O$ , and another alcohol.—Pharm. Journ., Dec. 28, 1895, 542; from L'Union Pharm., xxxvi, 385 and 433.

*Volatile Oil of Cicuta Maculata—Constituents.*—Freeman P. Stroup communicates in some detail his method of investigating the chemical constituents of the volatile oil of *Cicuta maculata*, and sums up his results as follows: The oil is composed mainly of two fractions, both terpenes, boiling respectively at 177.5° and 179.5° C.; and in addition to these are two smaller fractions, also terpenes, boiling at 181° and 185° C. respect-

ively, and a number of smaller fractions of undetermined chemical composition, having nearly all the physical characteristics of the terpenes of the general formula  $C_{10}H_{16}$ . Both the oil and its fractions are readily soluble in commercial alcohol, acetone, ether, benzin, benzol, chloroform and carbon disulphide, but are insoluble in water and glycerin. The oil and each of its principal fractions react violently with strong nitric acid, and quietly with iodine, producing colorless solutions. The author expresses the belief that the oil is simply a mixture of terpene with possibly a small trace of an oxygenated compound.—*Amer. Jour. Pharm.*, May, 1896, 236–242.

*Volatile Oil of Cannabis Indica—Characters, etc.*—See *Cannabis Indica* under “Materia Medica.”

*Oil of Peppermint—Commercial Purity.*—Louis Schulze gives the results of the examination of four commercial specimens of oil of peppermint, which show them all to be free from adulterants, but that two of them were deficient in menthol as determined by the test of the U. S. Pharmacopœia.—*Proc. Maryland State Pharm. Assoc.*, 1895, 41–42.

*Oil of Peppermint—Distillation in Japan.*—See *Peppermint*, under “Materia Medica.”

*Essential Oils of Black and White Peppermint—Character of Distinction.*—See *Mentha Piperita*, under “Materia Medica.”

*Thymol—Preparation of Aqueous Solutions.*—Hermats proposes an aqueous solution of thymol to be prepared by dissolving 1 Gm. each of thymol, tartaric acid and caustic soda in a small quantity of lukewarm water, then making up the solution to 2 liters with water. Arthur Schwarrock observes in this connection that the addition of a small quantity of glycerin to an alcoholic solution of thymol (definite proportions are not given), renders it possible to dilute the solution very materially with water without causing precipitation.—*Amer. Drugg.*, April 10, 1896, 215.

*Thymol and Carvacrol—Preparation and Characters of their Halogen Derivatives.*—Leo C. Urban observes that when thymol is acted upon by an alkaline iodine solution it forms a dithymol iodine derivative  $(C_{10}H_{12}OI)_2$ , which is commercially known as “aristol.” The same compound is formed if potassium iodide is added to an alkaline solution of the phenol, followed by a solution of chlorinated soda, and the author utilizes this in the preparation of

*Carvacrol Iodide* from the isomeric phenol carvacrol, as follows: Two grams of carvacrol and 3.8 grams of potassium iodide are dissolved in 40 Cc. of a ten per cent. aqueous solution of sodium hydroxide. Chlorinated soda solution is added under continuous stirring until no more of a precipitate is formed, the vessel being kept cool during the reaction by immersion in cold water. The precipitate is collected, washed first with water containing a very small quantity of alkali, then with pure water, and allowed to

dry spontaneously. The product is a bulky, grayish-yellow or buff-colored, amorphous powder, having a faint aromatic odor, and being soluble in ether, chloroform, benzin, and the fixed oils. Combining the antiseptic properties of carvacrol and iodine, it possesses the further advantage over iodoform in being practically odorless and at the same time four times more bulky. In an analogous manner the author has prepared

*Thymol Bromide* ( $C_{10}H_{12}OBr$ )<sub>2</sub>, substituting in the above proportions 2.5 grams of potassium bromide for the potassium iodide. It was obtained in the form of a bulky, yellowish, amorphous powder, becoming pale on exposure to light, nearly odorless, and having the same solubilities as the carvacrol iodide. The bromine estimations correspond to the formula given above. In the same manner

*Carvacrol Bromide* ( $C_{10}H_{12}OBr$ )<sub>2</sub> was obtained as an amorphous, grayish-yellow or pale buff-colored powder, odorless or nearly so, and possessing the same solubilities. These several compounds can be obtained like the thymol iodide by the direct action of the iodine or bromine dissolved in an alkaline iodide or bromide upon the alkaline solutions of the phenols, and by acting upon the latter with chlorinated soda solution alone.

*Amorphous Chlorides of the Phenols* were also formed, which will be the subject of a future communication.—Pharm. Review, March, 1896, 58-59.

*Carvone—Quantitative Estimation in Volatile Oils.*—Edward Kremer and O. L. Schreiner have made comprehensive experiments with the purpose of establishing a more convenient and reliable method for the quantitative estimation of carvone in volatile oils, a natural constituent which has so far been observed only in five volatile oils. Dextrogyrate carvone occurs in caraway oil (*Carum carvi*) and dill oil (*Anethum graveolens*), while laevogyrate carvone occurs in spearmint oil (*Mentha viridis*), crisped (curled) mint oil (*Mentha crispa*), and in kuromoji oil (*Lindera serica*). The methods that have hitherto been suggested are all more or less unreliable. That of *fractional distillation* has the advantage of simplicity, but is adapted only when large quantities of oil are at command, and when approximate results are sufficient. That which depends upon *the formation of a crystalline hydrogen sulphide addition product* is in so far superior to the first that it allows of the separation of the carvone in the form of a crystalline derivative; but, besides the length of time required for its execution, it has the drawback that the precipitation of carvone hydrosulphide is not quantitative, and that thiocarvone and its hydrosulphide are also formed. The third, *Hübl's iodine absorption method*, is open to numerous objections, and is as applied in general utterly unscientific. The fourth, *depending upon specific gravity*, is not available, because oils containing carvone do not simply consist of carvone and limonene: the latter, moreover, polymerizes and resinifies to a marked extent. A fifth method, *by means of phenyl hydrazine*, is claimed to be applicable to both

ketone and aldehyde constituents of volatile oils; but the results obtained with caraway oils are found to be lower than they should be, and the method also presents disadvantages in manipulation. Finally, *the estimation of carvone by means of the rotatory process* is of no use by itself, though in conjunction with the specific gravity determination, tests of volatility, etc., it may serve well on a preliminary test. The authors have prepared pure carvone from the fraction of caraway oil boiling above  $110^{\circ}$ , and established its purity by regenerating some that had been converted into carvone hydrosulphide, and the product from the latter was redistilled in the water vapor and dried. The first product had a sp. gr. 0.951 at  $20^{\circ}$ , and a rotation of  $+61.75^{\circ}$  at  $20^{\circ}$ ; the second = sp. gr. 0.959; rotation  $+61.19^{\circ}$ ; the third = sp. gr. 0.96058; rotation  $+62.65^{\circ}$ . From the fraction boiling below  $110^{\circ}$ , they prepared pure limonene, and with these two, mixed in equal proportions, they have established a method for the

*Quantitative Estimation of Carvone*, which is dependent upon the observation of Goldschmidt that carvone combines with hydroxylamine to form a relatively stable oxime, which is as follows: To a solution of 10 grams of the 50 per cent. carvone mixture in 25 Cc. of alcohol, 5 grams of hydroxylamine hydrochlorate and 6.5 grams of sodium bicarbonate are added; and the mixture boiled upon a water bath in a flask connected with a reflux condenser for half an hour. 25 Cc. of water was then added and the alcohol, which carries over a large quantity of limonene, was distilled off by the heat of the water bath. Steam was then passed through the liquid until traces of carvoxime came over as evidenced by the formation of crystals in the last portions of distillate collected separately in test tubes. The tube of the condenser was then washed with a little hot water and this, as well as the last collected distillate, containing some carvoxime, was returned to the flask. The contents of the flask were then allowed to cool, and after the carvoxime had completely solidified it was removed from the sides of the flask by means of a loop of stiff wire, thrown upon a force filter, washed and dried by suction. The air dried carvoxime was then transferred to a tared glass dish and heated for one hour on the water bath, and when cool weighed. To the weight thus obtained 0.100 gram was added, as this is about the quantity lost by heating. The weight so obtained of carvoxime ( $C_{10}H_{14}NOH=164.67$ ) multiplied by the fraction 0.9088 gives that of the carvone ( $C_{10}H_{14}O=149.66$ ). In four experiments the authors thus obtained the following figures: 50.00 per cent., 50.71 per cent., 50.83 per cent., 50.22 per cent. of carvone, proving the method to be correct within one per cent. of the true carvone content.

Before arriving at this method the authors had tried it in two other forms, differing only in the time of heating and in the care of collecting the oxime, these being designated respectively as Nos. I and II, whilst the one finally recommended is No. III. They have examined six samples of

*Commercial Caraway Oil* by the method designated as No. II, which

gives somewhat higher results (in round figures it gave 51, 53 and 54 per cent. of carvone in three experiments), and their results with the caraway oils (given in a table) must therefore be corrected slightly, and may be briefly stated as follows: sp. gr. = 0.921, 0.909, 0.910, 0.912, 0.934 and 0.895; angle of rotation in a 100 Mm. tube at  $20^{\circ}$  =  $+70^{\circ} 36'$ ,  $+77^{\circ} 4'$ ,  $+15^{\circ} 45'$ ,  $+68^{\circ} 41'$ ,  $+66^{\circ} 15'$ ,  $+50^{\circ} 46'$ ; carvone content = 54.21 per cent., 48.25 per cent., ?, 47.38 per cent., 52.65 per cent., 33.45 per cent. These figures apply to the oils before purification, slightly different results having been obtained with some of the oils which were also purified. In all cases the carboxime was in good condition, except in the case of the third oil, in which its amount was not estimated, and in which it was oily and resinous. In the fifth sample—the sequence in all the above figures corresponding to the number of the sample—the oxime was soft resinous from the crude oil, but nicely crystalline from the purified oil, which yielded 46.80 per cent. of carvone. The third sample was evidently grossly adulterated. The first and second were remnants from large quantities, while the fourth is interesting on account of its age, having stood on the shelf of an old pharmacy for at least 20 years.—Pharm. Review, April, 1896, 76–80.

*Oil of Pycnanthemum Lanceolatum*, Pursh.—*Chemical Examination*.—W. G. Correll has distilled the volatile oil from air-dried mountain mint (*Pycnanthemum lanceolatum*, Pursh.), gathered during the early part of August in full bloom, and subjected it to chemical examination. It was of a yellow color of medium depth, had an odor resembling pennyroyal, a sp. gr. at  $15^{\circ}$  C. of 0.9170, and in a 100 Mm. tube at  $20^{\circ}$  turned the plane of polarized light  $2.95^{\circ}$  to the right, hence corrected =  $+3.25^{\circ}$ . Preliminary tests for the presence of phenols gave the characteristic reaction of *thymol* and of its isomer *carvacrol*, and the latter was separated and identified by the author, and *carvacrol sulphuric acid* and *dicarvacrol*, having the distinctive character and melting points of these bodies, were prepared from it. The close resemblance of the mountain mint oil to oil of pennyroyal in odor, sp. gr. and other properties, induced the author to search for the presence of *pulegone* in the portions from which the phenols were separated. The results, so far, are in the negative, though he has obtained a fraction which corresponds in its composition with the formula for *pulegone*. On the other hand, it failed to yield the *pulegoneoxime* of Beckman or the *nitrosopulegone* of v. Baeyer. Incidentally the author calls attention to the convenience of Flückiger's test for

*Thymol and Carvacrol in Volatile Oils*, which depends upon the beautiful purple-red color produced on heating 0.01 Gm. of the oils with 0.01 Gm. of caustic potash and 20 drops of chloroform. The volatile oils of *monarda* and of *thyme*, which are known to contain these phenols, gave the reaction, while the following oils, which are supposed not to contain them, did not give the reaction, viz.: the oils of *pennyroyal* (3 samples), *spearmint*, *spike*, *lavender*, *rosemary*, *balm* and *peppermint*, and the follow-

ing coniferous oils: *turpentine, juniper berries, savin, cedar, balsam fir and spruce*.—Pharm. Rundschau, Feb., 1896, 32–33.

*Oil of Russian Anise—Constituents*.—G. Bouchardat and M. Tardy have examined the essential oil of Russian anise to ascertain its constituents in addition to its chief constituent, anethol, and they have been able to separate two compounds—*anisic aldehyde* and “*acétone anisique*,” a ketone. The first occurred more abundantly, 22 kilos of the oil yielding 80 Gm. of the aldehyde and *only 20 Gm.* of the ketone.

*Anisic Aldehyde* has an odor resembling that of hawthorn or dry hay; its density at zero is 1.141, and its formula is  $C_{10}H_8O_4$ . It does not affect the plane of polarization, and it combines with sodium bisulphite to form laminated and pearly crystals. It yields on oxidation a product identical with *anisic acid*,  $C_{10}H_8O_6$ . The ketone,

“*Acétone Anisique*,” like the aldehyde, exists naturally in the oil, being derived from the anethol by oxidation. It is optically inactive, has a density at 0° of 1.095, and an odor recalling that of the aldehyde. It also forms crystals of similar appearance with sodium bisulphite, but they contain a little less sodium. The composition of the ketone corresponds with the formula  $C_{20}H_{10}O_4$  or  $C_{20}H_{12}O_4$ . Its oxidation results in the formation of *anisic acid* as the chief product, together with traces of *oxalic acid* and of a volatile acid as yet undetermined. A small proportion of *anisic acid* was naturally present in the oil, and also traces of a liquid, the odor of which recalled that of *cuminic aldehyde*.—Pharm. Journ., Feb. 29, 1896, 164; from Compt. rend., cxxii. 198.

In a second paper the authors describe the constituents that are present in addition to the enormous proportion of anethol ( $C_{20}H_{12}O_4$ ) in Russian oil of anise. The total of these substances does not amount to more than one-twentieth the weight of the anethol present, and they are composed of very small quantities of *estragol*, *anisic aldehyde*, *anisic ketone* ( $C_{20}H_{10}O_4$ ), *anisic acid*, *anisic camphor* or *fenchone* ( $C_{20}H_{18}O_2$ ), several carbides of the formula  $C_{20}H_{24}$ , and some tarry matter.—Pharm. Journ., March 28, 1896, 243; from Compt. rend., cxxii., 624.

*Estragol—Identity with Isoanethol*.—Some years ago Grimaux endeavored to prove that *estragol*, the principal constituent of *estragon oil* and an isomer of anethol, is really *isoanethol*. He based his opinion upon the purely physical fact that the boiling points of the two bodies differed by 16°, that of pure anethol obtained from oil of anise being 222°, while that of *estragol* was 206°. The same difference of 16° is also found between the boiling points of *safrol* (232°) and *isosafrol* (248°) and between *eugenol* (248°) and *isoeugenol* (264°), though the higher boiling points are here in the iso-compounds. Carl Hell and Carl Gaab have now determined in a chemical way the correctness of Grimaux's view. They found that upon treatment of these two bodies with the necessary quantity of bromine, two crystalline products are obtained by fractioning, each of

which contains one atom of bromine in the nucleus to which two bromine atoms are linked. Subjected to oxidation with chromic acid, a ketone is produced from monobromanetholdibromide, under evolution of  $\text{HBr}$ , which contains only two bromine atoms, while in the case of monobrom-isoanetholdibromide no bromine is separated, and the ketone contains the original three atoms of bromine. The authors conclude that *anethol* contains the propenyl group and *isoanethol* the isomeric allylen group.—Pharm. Centralh., March 12, 1896, 147–148; from Ber. D. Chem. Ges., 1896, 334.

*Sandalwood Oil*—*Method of Examination, etc.*—E. J. Parry records some experiments made with the view to determine a reliable method for its quantitative examination. It consists, according to Chapoteaut, almost entirely of two bodies, an alcohol termed *santalol* ( $\text{C}_{15}\text{H}_{26}\text{O}$ ) and a body  $\text{C}_{15}\text{H}_{24}\text{O}$ , which is present only in small quantity and is probably the aldehyde corresponding to the alcohol. The author has not been able to determine the presence of this aldehyde by the well known bisulphite method; but he has determined the presence of traces of acid and variable quantities of saponifiable oil as normal constituents of the pure oil. After a number of experiments he found that the best way of valuing the oil was by an estimation of the amount of santalol. This is effected by conversion of the santalol into an acetate, and an estimation of the amount of acetic acid present in the acetylated oil, the process being as follows: 10 Gm. of the oil are digested with an equal volume of glacial acetic acid (of at least 99.5 per cent.) in a pressure flask for an hour and a half at  $150^{\circ}\text{C}$ . The resulting oil is well washed until the last traces of acetic acid are removed, dried, and saponified with alcoholic potash in the usual way, the amount of potash being noted. Operating in this way upon five samples of pure oil, the author found the original oil to require from 0.62 to 0.96 per cent. of  $\text{KOH}$ , and the acetylated oil from 18.66 to 19.85 per cent. of  $\text{KOH}$  for saponification, indicating a percentage of from 83 to 90 per cent. of santalol. The sp. gr. of the samples ranged from 0.9779 to 0.9803; the iodine numbers by Hübl's method were within the limits 190 to 200. The author also subjected fractional portions of a 20 lb. batch of oil, specially distilled for this purpose, to examination, selecting the first, the middle, and last two ounces. The results are as follows:

	Sp. gr.	Iodine.	KOH for original oil.	KOH for acetylated oil.	Santalol.
First fraction.....	0.9649	197.9	0.44 per cent.	17.03 per cent.	76 per cent.
Middle fraction.....	0.9758	200.6	0.65 per cent.	20.44 per cent.	93 per cent.
Last fraction.....	0.9805	190.9	1.04 per cent.	19.66 per cent.	87 per cent.

These results prove that the greater part of the aldehyde comes over in the earlier fractions, and that the saponifiable oil increases in quantity as distillation proceeds. The author also made some experiments with cedar wood oil, which is a very frequent adulterant of sandal wood oil. Four samples of cedar wood oil were acetylated, and were found to require 1.72, 2.13, 2.21 and 2.32 per cent. of KOH respectively for saponification. The result indicates that any decided adulteration of sandal wood oil with cedar wood oil can be readily determined by the saponification method described by the author.—Pharm. Jour., Aug. 10, 1895, 118-119.

*Oils of Sassafras Bark and Leaves—Chemical Composition and Distinction*—Fred. B. Power and Clemens Kleber, having distilled a considerable amount of oil directly from sassafras bark, subjected it to complete study with results given below. The yield of oil from the air-dry root bark was 7.4 per cent. The oil has a yellowish or reddish-yellow color, a specific gravity of 1.075 at 15° C, and an optical rotation of +3°16' in a tube of 100 Mm. The wood of sassafras roots, deprived of the bark, yielded only 0.9 per cent. of oil, but this had the same specific gravity and other properties as the oil from the root bark. Leaving out the details of the experiments, the results of the investigation prove the

*Oil of Sassafras Root-Bark* to contain the following constituents and their relative proportions: Safrol ( $C_{10}H_{10}O_2$ ), about 80.0 per cent.; pinene ( $C_{10}H_{16}$ ) and phellandrene ( $C_{10}H_{18}$ ), together about 10.0 per cent.; camphor, dextrogyrate ( $C_{10}H_{16}O$ ), 6.8 per cent.; eugenol ( $C_{10}H_{12}O_2$ ), 0.5 per cent.; a high boiling portion, consisting of cadinene ( $C_{15}H_{24}$ )?, and residue, about 3.0 per cent. This summary shows a marked similarity in the qualitative composition of sassafras oil and camphor oil, the latter containing in addition small amounts of cineol and dipentene. The authors have also had opportunity to prepare the volatile

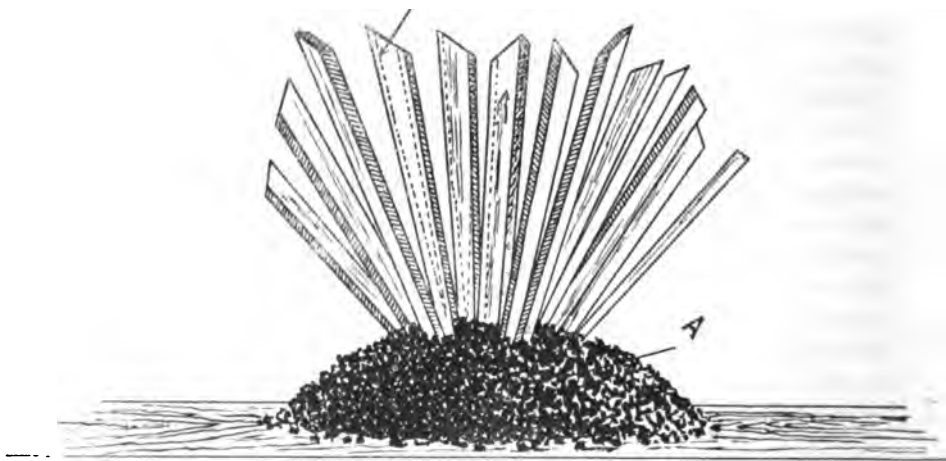
*Oil of Sassafras Leaves* in quantity, the yield from 8000 lbs. of fresh leaves being exceedingly small—only 0.028 per cent. The oil possesses a light yellow color and an exceedingly agreeable, somewhat lemon like odor. Its specific gravity is 0.872 at 15°C. and its optical rotation +6° 25, in a tube of 100 Mm. The results of their investigation, which is given in some detail, show the oil of sassafras leaves to contain the following constituents, but their relative proportions remain to be determined: Pinene ( $C_{10}H_{16}$ ); myrcene? ( $C_{10}H_{16}$ ); phellandrene ( $C_{10}H_{16}$ ); linalool ( $C_{10}H_{18}O$ ); geraniol ( $C_{10}H_{18}O$ ); the acetic and valerianic esters of these alcohols ( $C_{10}H_{17}-C_2H_5O_2$  and  $C_{10}H_{17}-C_3H_9O_2$ ); cadinene? ( $C_{15}H_{24}$ ); and a paraffin ( $C_nH_{2n+2}$ ). The authors observed that, so far as they are aware, this fragrant oil has not heretofore been obtained, or at least not in amount sufficient for its chemical examination; and, furthermore, that in the two oils here described we have a striking and interesting example of the fact, which has been repeatedly observed in other instances, that different parts of the same plant may produce essential oils which are fundamentally different in their chemical composition.—Pharm. Rundschau, May 1896, 104-106.



*Monobromated Camphor—Formation of Tubular Crystals.*—Lyman F. Kebler, after making some remarks upon peculiar forms and development of crystals that have been observed—such as that of a well developed crystal within a larger one, of cavernous crystals, or “hoppers,” characteristic formations of halite, galena, and potassium—calls attention to some hollow crystals of monobromated camphor recently obtained by him. They were obtained in this instance—never before nor since—as follows: A quantity of crude monobromated camphor was dissolved in an equal weight of hot benzin, one-fourth as much animal charcoal added as there was monobromated camphor, boiled on the water-bath for about fifteen minutes, removed, vigorously rotated, so that the charcoal accumulated cone-shaped in the center of the bottom of the flask, and allowed to cool and crystallize over night. The crystals radiated in all directions from the cone-shaped charcoal, as shown by Fig. 66. The tubular structure was observed

FIG. 66.

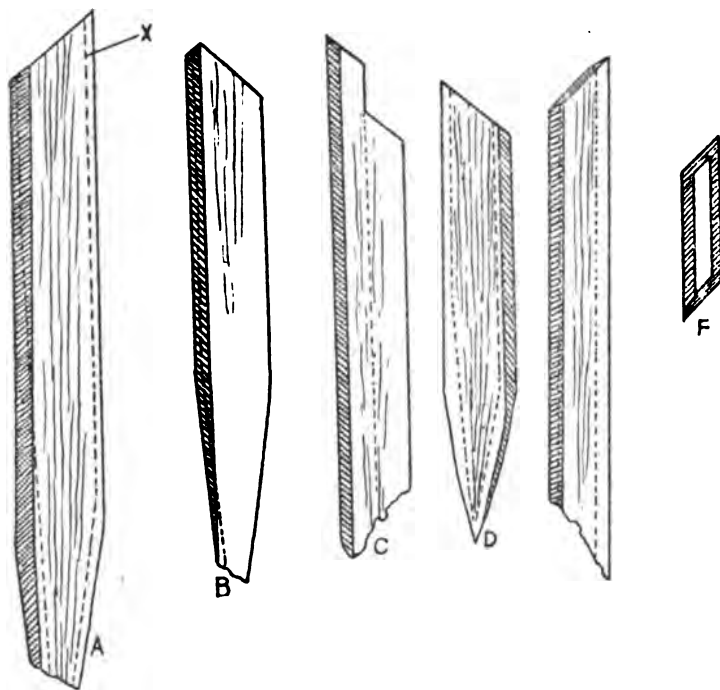
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by the mother-liquor retreating from the hollows of the crystals while drying them on filter paper. The prismatic, monoclinic crystals varied in length from 2.5 to 4.2 centimeters, in width from 3 to 4.6 millimeters, and in thickness from 1.5 to 3.1 millimeters. The cross sections of the crystals as well as of the orifices are rhombs. The free ends of the crystals are terminated by single planes, inclined about  $45^\circ$ , while a few are terminated by two planes, forming nearly a right angle with each other. The supporting ends of the crystals are somewhat constricted, on account of the crystal aggregate, a distortion which destroys the symmetry of the hollow as well as that of the crystal. Fig. 67 represents the various crystals in cross section and side view.—*Amer. Jour. Pharm.*, Dec., 1895, 602-605.

*$\delta$ -Bromocamphor—Preparation.*—According to C. Revis and F. Stanley Kipping, the dextrorotatory  $\delta$ -monobromo-camphor, which was first obtained by Kipping and Pope by heating camphorsulphonic bromide, can be more conveniently prepared from  $\alpha$ -dibromocamphor. The last-named substance is readily attacked in alcoholic solution by sodium amalgam, and, under suitable conditions, the  $\alpha$ -halogen atom only is displaced by

FIG. 67.



hydrogen with formation of  $\delta$ -bromocamphor. The substitution may, however, also be accomplished with the aid of zinc dust and acetic acid, the yield of  $\delta$ -bromocamphor being good in both cases. Other products are also formed: the odor of camphor is very noticeable when the reduction has proceeded for some time, and a crystalline "by product," containing no bromine and evidently a product of condensation, is obtained in small quantities. This crystallizes in colorless hemimorphic crystals from diluted alcohol, melts at  $248^{\circ}$ , and has a composition which points to the formula  $C_{20}H_{30}O_2$ . It is readily soluble in chloroform, benzene, and acetic acid.—Chem. News, May 1, 1896, 208.

*$\alpha$ -Bromocamphorsulphonic Acid—Oxidation Products.*—Arthur Lapworth and F. Stanley Kipping record the results of some experiments made with ammonium  $\alpha$ -bromocamphorsulphonate in the hope of obtaining a new ser-

ies of oxidation products from camphor. By boiling the ammonium compound with moderately concentrated nitric acid, they obtained a compound which separates from acetic acid in fine orthorhombic prisms, melts at  $188^{\circ}$ – $189^{\circ}$ , has a composition approximating to the formula  $C_{10}H_{12}SO_4Br_2$ , and appears to be a *sulpholactone* derived from a hydroxydibromcamphorsulphonic acid by the elimination of one molecular proportion of water. As the result of a number of operations upon the acid filtrate resulting from the separation of the *sulpholactone*, two additional crystalline substances have so far been obtained. The one is a sulphonic acid which crystallizes from a mixture of methyl alcohol and ethylic acetate in pyramidal form, melts at  $156^{\circ}$ – $158^{\circ}$  with evolution of gas, is very soluble in water, and separates from this in hydrated crystals melting at  $128^{\circ}$ – $133^{\circ}$ . Its composition corresponds to that required for the formula of a *hydroxydibromcamphorsulphonic acid*— $C_{10}H_{14}SO_6Br_2$ . The other compound is apparently the ammonium dihydrogen salt of  $\delta$ -*sulphocamphonic acid*, its composition agreeing fairly with the formula  $C_{10}H_{16}O_4SO_3ONH_4$ . It separates from alcoholic ethyl acetate in microscopic plates, is extremely soluble in water, but nearly insoluble in cold acetone. A crystalline compound, apparently a *sulphonic bromide* derived from hydroxydibromcamphorsulphonic acid has been separated, but requires further examination.—Chem. News, May 1, 1896, 208.

*a-Chloronitro Camphor—Decomposition Products.*—Arthur Lapworth observes that it has long been known that *a*-bromo- and *a*-bromonitro camphor undergo, when heated, a somewhat violent decomposition, resulting in the liberation of nitrous fumes and free halogen, and the formation of undetermined products. These latter the author has now examined, and he has succeeded in obtaining, by the decomposition of *a*-chloronitro camphor, a quantity of a yellowish substance, which crystallizes in long needles, melting at  $196^{\circ}$ – $198^{\circ}$ , volatilizes slightly at the ordinary temperature, yields a hydrazone melting at  $169^{\circ}$ – $171^{\circ}$ , and proves to be identical with the

*Camphor-quinone*, obtained by Classen from iso-nitroso-camphor. The analytical data correspond well with the required formula  $C_{10}H_{14}O_2$ .—Chem. News, May 1, 1896, 207.

*Campholide—A Product of the Reduction of Camphoric Anhydride.*—A. Haller has obtained a new compound, campholide ( $C_{10}H_{16}O_2$ ), by reducing camphoric anhydride in alcoholic solution with sodium amalgam, keeping the liquid acid by means of dilute sulphuric acid.—Chem. News, March 6, 1896, 119; from Compt. rend., Feb. 10, 1896.

*Caryophyllin—Preparation and Characters.*—Theodore Wm. Schaefer finds as the result of his studies that caryophyllin, which for years has been regarded as a camphor—"clove camphor"—is no camphor at all. It is an indifferent substance, possessing none of the essential characters of the

camphors. It does not, for instance, unite with chloral to form a liquid, and does not form striking compounds with the phenols. In an experience extending over years, also, he has never noticed the deposit of a stearoptene from oil of cloves, nor could such be obtained by prolonged refrigeration as is claimed in some text-books. The author prepares caryophyllin by extracting finely-powdered cloves with ether, decolorizing the ethereal solution with animal charcoal, and then mixing the solution with water containing a small quantity of ammonia. A flocculent white precipitate is produced, which is washed on a filter with water, and finally pressed between warm sheets of filter paper to remove any oil that may adhere to it. So obtained, caryophyllin is a white, dry, scaly powder, crystallizable in silky needles, nearly odorless and tasteless, melting when heated gently, and giving off an empyreumatic odor when strongly heated. It is freely soluble in ether, soluble in boiling alcohol and in chloroform, but very sparingly only in these solvents cold. With conc. sulphuric acid it gives a blood red color.—Merck's Rep., Mar. 1, 1896, 114.

*Oil of Cassia—Aldehyde Determination and Examination of Commercial Samples.*—The experience of Lyman F. Kebler leads him to remark that while in general the U. S. P. requirements are satisfactory for detecting fraudulent oil of cassia, the per cent. of cinnamic aldehyde should always, if possible, be estimated. For this purpose it is necessary to have a flask of about 100 Cc. capacity, provided with a neck of about 8 millimeters internal diameter and 13 centimeters long, graduated in tenths up to 6 cubic centimeters. Into this flask measure exactly 10 Cc. of the oil; warm the flask and contents well on a water bath, add about 20 Cc. of a 30 per cent. solution of sodium bisulphite, and agitate the mixture thoroughly several times, carefully avoiding spirting. The flask is then placed on a hot water bath, and heated until the curdy coagulum, which had formed almost immediately, has assumed a fluid state. Then add solution of sodium bisulphite in small portions at a time, shaking and warming as before, until the coagulum is completely dissolved, a clear layer of oil floats upon the surface of the solution, and the flask is about three-fourths filled. Not a speck of curd must be visible. After allowing the flask and contents to cool, it is filled up with saturated sodium sulphite (or common salt) solution until the oily layer rises into the neck, and the line of demarcation coincides exactly with the lowest mark on the neck of the flask. The loss in the volume of oil is thus at a glance read off, and represents the amount of aldehyde in the sample, plus the small amount of cinnamic acid held in aqueous solution, and by multiplying the number of Cc. of such loss by 10, the per centage of cinnamic aldehyde in the sample of oil of cassia is approximately ascertained. Duplicates vary from each other as much as 2 per cent.

The author examined six commercial samples of cassia oil. No. 1, which was guaranteed pure, proved so. No. 2 proved pure according to the U. S. P. requirements; Nos. 3, 4 and 5 were taken from original containers,

sealed and marked Yan Loong, a mark usually representing a high grade oil. No. 6 was a known mixture of the oils of cassia, rosin and copaiba, made to test the accuracy of the aldehyde process in the presence of these substances, and these did not vitiate the results. No. 7 was petroleum oil obtained from one of the containers, having been added in excess of saturation. The results are tabulated by the author, the most important points being the following: The sp. gr. of Nos. 1 and 2 were 1.0566 and 1.0692, the percentage of aldehyde 79.5 and 64.0 per cent. respectively, they were soluble in alcohol and in 70 per cent. alcohol, and gave no precipitate with lead acetate. Nos. 3, 4 and 5 had sp. gr. of 1.0452, 1.0490 and 1.0428, the percentage of aldehyde was 56.0, 64.0 and 54.0 respectively, they were insoluble in 70 per cent. alcohol, soluble in alcohol, and gave precipitates with lead acetate, as did also No. 6, which was not alone insoluble in 70 per cent. alcohol, but also in an equal part of alcohol. Moreover, Nos. 3, 4 and 5 became turbid at 18°, 12° and 20° C., respectively, whilst Nos. 1 and 2 were not affected.—*Amer. Jour. Pharm.*, April, 1896, 193-195.

*Oils of Wintergreen and Sweet Birch—Re-examination of their Chemical Composition.*—F. B. Power and Clemens Kleber have re-examined and studied the chemical composition of the oils of wintergreen and sweet birch bark, partly with the view to confirming the results of previous studies upon these oils by one of them (Dr. Power), and partly to throw further light upon some discrepancies that exist in the recent literature upon the subject, a brief review of which may be given as follows. Up to a comparatively recent period the old statement of Cahours that oil of wintergreen contained 10 per cent. of a terpene,  $C_{10}H_{16}$ , which he termed gaultherilene, has been accepted as correct; but this has been disproved by all subsequent experimenters, and it is now suspected that the sample examined by Cahours must have been adulterated to the extent of 10 per cent. with oil of turpentine. In 1889, Trimble and Schroetter examined the oils of wintergreen and sweet birch bark, and found that these oils are physically and chemically identical, that they are composed almost entirely of methyl salicylate, but that they contain about 0.3 to 0.447 per cent. of hydrocarbon of the formula  $C_{15}H_{24}$  (consequently a sesquiterpene) together with small quantities of benzoic acid and ethyl-alcohol. Furthermore, that the only difference detected in the two oils was in the melting point of the hydrocarbons, that from wintergreen melting at 10° to 15° C., that from birch at 18° C. Moreover, it is presumed that the hydrocarbon is made up of a solid and a liquid portion. Subsequently, during the same year, Dr. Power obtained results which led him to the conclusion that oil of birch is methyl salicylate pure and simple, and that it is without action upon polarized light. Oil of wintergreen, on the other hand, was found to contain about 0.3 per cent. of a body which was conceded to be a terpene (though doubted after later experiments), but there

was no evidence of the presence of either benzoic acid or ethyl alcohol. In further distinction from oil of birch, oil of wintergreen was found to deviate a ray of polarized light to the left. Finally, in the recent work of Sadtler and Trimble on "Pharmaceutical and Medical Chemistry" (1895), the two oils are substantially stated to be identical, both consisting mainly of methyl salicylate with a small amount—less than 1 per cent—of a hydrocarbon or sesquiterpene.

The present authors have had the opportunity during the past ten years of distilling considerable amounts of the natural oils of wintergreen and sweet birch, and, furthermore, of examining hundreds of specimens of these oils from other sources, as they occur in commerce, and have therefore felt warranted in pursuing the study of their chemical composition. The oils employed for this purpose were in part distilled by themselves, and in part obtained from other known and trustworthy sources, and in the latter case they were carefully compared with oils of their own distillation, in order to be assured of their purity. The oil of sweet birch was supplied by Mr. Geo. W. Kennedy, of Pottsville, Pa.

The yield of oil from wintergreen leaves—*Gaultheria procumbens*, Linné—was from thoroughly dried leaves, 0.65 to 0.75 per cent., from fresh leaves, collected late in summer, 0.24, 0.32 and 0.35 per cent., respectively. Several other distillers of this oil have observed the yield to vary from 0.5 or less to about 0.8 per cent., sometimes amounting to but mere traces, according to the season at which the leaves were collected. The yield of oil from sweet birch bark—*Betula lenta*, Linné—was from the air dried bark, 0.6 per cent., from the fresh bark, 0.28 and 0.39 per cent., and from young twigs, consisting of wood and bark, 0.13 per cent. As found in commerce, this oil is usually obtained by the distillation of young trees, which by means of a chopping machine are cut into pieces of from 1 to 4 inches in length. The yield of oil from this material is said to be about 0.23 per cent. The authors give a very voluminous account of the very exhaustive studies and experiments they have made with these oils, and summarize their results as follows:

I. *Oil of Wintergreen* (*Gaultheria*) contains about 99 per cent methyl salicylate, together with a small amount of a paraffin, which is probably triacontan,  $C_{30}H_{62}$ , an aldehyde or ketone, an apparently secondary alcohol,  $C_8H_{16}O$ , and an ester,  $C_{14}H_{24}O_2$ .

A pure, fresh oil of gaultheria deviates a ray of polarized light to the left, and the extent of the rotation should not be less than  $-0^\circ 25'$  in 100 Mm.

II. *Oil of Sweet Birch* (*Betula*), in its unrectified state, contains about 99.8 per cent. of methyl salicylate, together with a very small amount of the above mentioned paraffin,  $C_{30}H_{62}$ , an aldehyde or ketone, and the ester,  $C_{14}H_{24}O_2$ , but does not contain the alcohol,  $C_8H_{16}O$ , which is found in gaultheria oil.

The oil of sweet birch is always optically inactive.

III. Both of the oils have a sp. gr. varying from 1.180 to 1.187 at 15°C. Both of them, as well as synthetic methyl salicylate, form a clear solution with five times their volume of 70 per cent. alcohol, at 20° to 25° C.

*Neither the oil of gaultheria nor the oil of sweet birch contains any trace of benzoic acid or its esters, nor do they contain any terpene or sesquiterpene.*—Pharm. Rundschau, Oct. 1895, 228-232.

*Oils of Wintergreen and Birch—Comparison of Conclusions Concerning their Composition.*—Henry Trimble, referring to the recent studies upon the composition of the oils of wintergreen and birch, gives a parallel summary of the most important conclusions regarding these oils, and expresses the opinion that this shows that Power and Kleber's conclusions in 1895 are much nearer Trimble and Schroetter's of 1889 than those of Power in the same year. Conceding, until after further study, the results of Power and Kleber concerning the optical inactivity of one and activity of the other oil, and those concerning the hydrocarbons, the only vital question at issue now is concerning the presence or absence of benzoic acid and ethyl alcohol in these oils. Power and Kleber have apparently not tried the method employed by Trimble and Schroetter for the separation and detection of benzoic acid, and the author is therefore not willing to accept their dictum as conclusive.—Amer. Journ. Pharm., Nov. 1896, 560-562.

*Oil of Wintergreen—Examination of Commercial Samples.*—Charles H. LaWall reports the following results of an examination of fifteen commercial samples offered as oil of wintergreen, which show remarkable uniformity as regards specific gravity and boiling point, but varied in color from deep red to colorless.

No.	Sp. Gr.	Boil. Point.	Color.	No.	Sp. Gr.	Boil. Point.	Color.
1	1.180	217° C.	Dark red.	9	1.186	215° C.	Yellow.
2	1.180	214°	Light red.	10	1.184	215°	Yellow.
3	1.186	214°	Colorless.	11	1.186	216°	Red.
4	1.182	215°	Red.	12	1.187	216°	Light red.
5	1.185	216°	Dark red.	13	1.184	216°	Yellow.
6	1.185	215°	Colorless.	14	1.186	216°	Colorless.
7	1.187	215°	Colorless.	15	1.182	215°	Yellow.
8	1.189	215°	Red.				

The specific gravity of a number of the samples is shown to be slightly higher than is required by the Pharmacopœia, which specifies from 1.175 to 1.185. The average of the fifteen samples, however, is within these limits, being 1.184. The average boiling point is 215° C.—Proceedings Pennsylvania Pharm. Assoc. 1895, 96-97.

*Methyl Salicylic Ether*.—Production in plants by the action upon a glucoside—gaultherin—by a characteristic ferment, *gaultherase*, which see, under "Ferments."

*Benzaldehyde—Determination in Kirschwasser*.—Cuniasse and Raczkowski recommend the following method for estimating the benzaldehyde in kirschwasser (cherry brandy): 200 Cc. of the sample are distilled and the distillate is brought (with water) to 200 Cc., so that the alcohol may be determined by specific gravity. To this distillate 4 Cc. of

*Fischer's Reagent for Benzaldehyde* (2 p. hydrochloride of phenylhydrazine, 3 p. acetate of sodium, 20 p. water), freshly prepared, are then added, the mixture shaken, diluted with 200 Cc. of water and filtered. The residual "benzaldehyde-phenylhydrazine" upon the filter is washed repeatedly with water containing alcohol (? Rep.), dissolved in absolute alcohol, the solution evaporated in vacuo, and the crystalline residue weighed. The weight found, multiplied by 0.54, gives the quantity of benzaldehyde in the 200 Cc. of kirschwasser examined.—Pharm. Centralh., Aug. 15, 1895, 460; from Monit. Scient., 1895, 917.

#### ALCOHOLS AND DERIVATIVES.

*Alcohol—New Sources*.—G. Rivière and M. Bailhage have experimented with the view to ascertaining the possibility of utilizing *Asphodelus ramosus* and *Scilla maritima* as a source of alcohol, their experiments being made with pure cultivated wine yeast. The alcohol obtained by them both from the asphodel and the squill is described as being of equally good quality, and the authors think its manufacture from those sources may constitute a profitable industry, especially in Algeria and Tunis, where both plants grow wild and in abundance.—Pharm. Journ., Nov. 30, 1895, 453; from Compt. rend., cxxi., 659.

*Alcohol—Simple Formula for Deodorization*.—F. G. Earl communicates the following simple formula for removing the pungent odor from ordinary alcohol and rendering it suitable for use in perfumery and for elixirs: alcohol, 95 per cent., 1 gall.: powdered unslacked lime, 4 drachms; powdered alum, 2 drachms; sweet spirit of nitre, 1 drachm. Rub the lime and alum in a mortar, add the alcohol, and shake well; then add the spirit of nitre. Set aside for seven days, and filter through animal charcoal.—Chem. and Drugg., July 6, 1895, 35.

*Alcoholic Fermentation—Influences Determining the Yield*.—Rietsch and Herselin find that the proportion of alcohol obtainable from a given quantity of sugar varies considerably with the kind of yeast used in the fermentation. They have also studied the influence of aeration upon alcoholic fermentation at different temperatures, and find that in the case of worts containing only about 100 Gm. of sugar per liter, aeration exercises but little influence upon the proportion of alcohol from fermented liquid at a temperature approaching 36° C., the differences observed being



in favor of the elevated temperature. With more concentrated worts a decidedly harmful effect is produced by elevating the temperature to the same point, but aeration neutralizes this ill effect in great measure. Better results are obtained, however, at about  $30^{\circ}$ , even without aeration. It would appear, therefore, that the value of aeration is greater as the concentration of the wort is increased and the temperature elevated. The cooling of worts below  $30^{\circ}$  has, however, a more pronounced effect than aeration, and a combination of these two processes will probably lead to the best results, more especially when the worts are concentrated.—Pharm. Jour., Sept. 28, 1895, 262; from Comp. rend., cxxi., 378.

*Fermentation—Review.*—John Well has read a paper before the Liverpool Pharmaceutical Students' Society in which he interestingly reviews the different fermentative processes and their economic application. The paper, as given in abstract, may be profitably consulted in Pharm. Jour., Feb. 1, 1896, 87, 88.

*Ethers—Technical Uses.*—At the recent meeting of naturalists, at Lübeck, Arend gave an interesting account of the technical application of ether at the present time. The use of (ethyl) *alcohol* as solvent is well known. *Ether* (ethyl) is largely used as a solvent in the manufacture of coal-tar colors, and for the preparation of *collodion*, which in its turn is technically used for the preparation of certain varnishes that are used in enormous quantities in the manufacture of toys. Collodion is also used in the manufacture of an *artificial silk*, the inflammability of which has hitherto been a drawback to its more extended application, but is completely overcome by treatment with alkalis. *Formic ether* is used for the manufacture of rum, arack, and cognac essences; absolute *acetic ether* in the manufacture of so-called smokeless gunpowder; pure *acetone* in the manufacture of the latter, and in less pure form in the manufacture of chloroform, iodoform and varnishes. *Butyric ether* finds application in the manufacture of fruit essences, as do also *valerianic* and *sebacic ether*; while *benzoic ether* is used under the name "Niobe oil" in perfumery, and *ænanthic ether* for the preparation of artificial rum, brandy, etc. The corresponding *amyl alcohol* derivatives—*formate*, *acetate*, *butyrate*, *valerianate*, as well as the alcohol itself—also find extended use in some cases as solvents, in other as flavoring agents.—Pharm. Centralh., Oct. 3, 1895, 563, 564.

*Esters—Improved Conditions for their Preparation.*—The commonly accepted view, originated by the observation of Berthelot, in connection with the preparation of acetic ether, that the yield of esters is increased in proportion to the amount of mineral acid employed in the reaction of equal molecules of the components of the esters upon each other, is now contradicted by results obtained by E. Fischer and A. Speier, who find that the same and even better yields are obtained by the employment of smaller amounts of mineral acids. It is customary to employ either hydro-

chloric or sulphuric acid for this purpose. The authors have experimented with both for the production of

*Benzoic Acid Ethyl Ester.* They find (1) That when 50 Gm. benzoic acid are boiled with 100 Gm. absolute alcohol containing 3 per cent. gaseous hydrochloric acid for two hours with a reflux condenser, the yield of benzoic ester was 76 per cent. of the theoretical quantity, which is about 1 per cent. higher than the best yield heretofore recorded; and (2) That if the hydrochloric acid is replaced by 10 per cent. of concentrated sulphuric acid, and the boiling prolonged to 3 hours, the yield was nearly 90 per cent. of the theoretical quantity of benzoic ester. These figures, however, can be applied only to the production of benzoic ester. Numerous experiments made with other acids show the necessity of determining the most suitable proportions and conditions in each case.—Pharm. Centralh., April 9, 1896, 221; from Ber. d. D. Ch. Ges., 1895, 3252.

*Ether—Semi-Centennial of Its Introduction as an Anæsthetic.*—Prof. Binz has recently published in Richard Fleischer's "Deutsche Revue" a valuable historical sketch of the successive stages through which the anæsthetic application of ether has gone since its first application in surgery, which will be fifty years ago next October.—Pharm. Journ., May 23, 1896, 412.

*Ether—Purification by the Intervention of Liquid Paraffin.*—The following method for purifying ether sufficiently for most analytical purposes is given in "Chem. Ztg." The ether is mixed with 5 to 10 per cent. by volume, of liquid paraffin, and then distilled at a temperature of 40° to 50° C. The liquid paraffin retains all the impurities, but parts with them again when heated to 120°, and may then be used again for the same purpose. The method is equally applicable to the purification of petroleum ether, light benzin, aldehyde, chloroform, etc.—Pharm. Centralh., Oct. 10, 1895, 589.

*Ethyl Bromide—Detection of the Presence of Ethyl Ether.*—The presence of ethyl ether in ethyl bromide is easily determined by the rise of temperature which follows the addition and admixture of concentrated sulphuric acid. If a small quantity of ethyl bromide is heated in a test tube, with an immersed thermometer, to 20°, and a few drops of concentrated sulphuric acid are allowed to flow in, there will be a considerable rise of temperature noted if ethyl ether is present, whilst pure ethyl bromide occasions no rise in temperature at all. In the presence of 15 per cent. of ethyl ether the temperature will rise to about 34°, and lively ebullition will result.—Pharm. Centralh., July 18, 1895, 410.

*Ethyl Formate—Characters and Antiseptic Uses.*—Ethyl-formic ether is described by E. Merck as a liquid having the odor of peach kernels, the sp. gr. 0.937, boiling at 54.4° C., and soluble in 10 parts of water. Ac-

cording to G. O. Drossbach the vapor of this ether when largely diluted with air prevents the formation of bacteria with great certainty, and, producing no unpleasant effects when inhaled, has been used with advantage in throat affections. Experiment may possibly prove this ether to be useful for inhalations in the treatment of infectious diseases of the respiratory organs.—Pharm. Centralh., Febr. 20, 1896, 107.

*Chloroform—Manufacture from Acetone produced directly from Acetic Acid.*—Dr. Edward R. Squibb in a lengthy paper reviews the history of acetone, and particularly of "Acetone Chloroform," in which he points out very conclusively that the grant of a patent in 1888 is defective in equity, since all the practical points claimed in the patent have been well-known and public property for many years prior to the issue of the patent. But while it is difficult to understand how the existing patents, claiming to control the proportion of well-known chemical materials in long-known chemical reactions, could be issued, the fact remains that they have been granted, and, therefore, command respect. Dr. Squibb, in seeking new outlets for acetic acid, determined to convert the acid into chloroform, and determined also to respect these patents. In the intermediate step of making acetone, acetic acid was used, not to evade the patents but because by its use the impurities of the crude acetate of lime were avoided and a larger yield of acetone was obtained. In the use of acetic acid instead of the acetates of the patent an entirely different apparatus and management are required and used, and if the patent did not exist the author would not use either its apparatus or management, but would prefer a rotatory still and a continuous process. With regard to the next step, wherein the acetone is converted into chloroform, this is accomplished by a reaction that was long and well known before the date of the patent, and the proper proportions of material required for the reaction were easily obtainable by calculation, and this knowledge also antedated the patent. The patent, in brief, simply covers a specially devised and described apparatus and management which Dr. Squibb does not use and does not want to use even if they were not patented, but much prefers his old form of apparatus and management described in 1857, and used for many years in making alcohol chloroform. And the successful use of this apparatus and management for acetone chloroform is simply in accordance with the statement of Liebig in 1832, that acetone could be successfully used under the same conditions as alcohol.—Ephemeris, January, 1896 (iv., No. 4), 1743-1757.

*Chloroform—Preservation by Means of Sulphur.*—L. Allain states that chemically pure chloroform may be preserved indefinitely by saturating it with sulphur. The sulphur is prepared for this purpose from ordinary sublimed sulphur by leaving it in contact with four times its weight of pure caustic ammonia during twenty-four hours, washing it with distilled water until neutral to litmus, placing it into a stove regulated at a temperature of 40° C. for four days, and finally drying it over sulphuric acid for fifteen

days. Purified chloroform exposed to direct sunlight gave a precipitate with argentic nitrate after about forty-eight hours, but underwent no change under similar conditions if previously saturated with sulphur, except that there was a deposit of insoluble sulphur. Specimens thus treated have been exposed to sunlight for four months without any alteration that could be detected by the usual reagents, and were found to cause perfectly normal anaesthesia in men and the lower animals, without accident. In diffused daylight the addition of one-thousandth part of its weight of sulphur preserved chloroform indefinitely in the presence of a great excess of oxygen.—Pharm. Journ., Sept. 28, 1895, 261-262; from Journ. de Pharm. (6), xv., 252.

*Chloroform—Methods of Preservation.*—D. B. Dott having his attention drawn to the preservation of chloroform by the statement of L. Allain that the addition of one part of sulphur to a thousand parts of chloroform prevented its decomposition for an indefinite period when it is exposed to diffused daylight, and remembering that previous investigation had shown that oxygen is essential to the decomposition of chloroform, and that, therefore, the addition of any substance prone to oxidation would probably act well as a preservative, has made a number of experiments which support the correctness of the view. Exposing absolute chloroform in four bottles under identical conditions to diffuse daylight, and occasionally to the sun's rays direct, the bottle containing the pure chloroform showed signs of decomposition after a few weeks, whilst the three bottles of chloroform to which minute quantities of morphine, of gallotannic acid, and of hypophosphorous had been added, were not changed after exposing them for a month longer.—Pharm. Jour., March 28, 1896, 249.

*Bromoform—Characterization of the Medicinal Substance.*—Dr. Vulpus calls attention to the necessity of a small percentage of alcohol in bromoform, which, even more so than chloroform, is liable to decompose when absolutely pure. In the absence of a characterization of this important remedial agent by the German Pharmacopœia, reference must be had to the various compendiums and text-books for each, but the statements here respecting the sp. gr., boiling points and congealing points of pure bromoform, and of such containing certain percentages of alcohol, are quite confusing and misleading. The author has therefore investigated the subject, with results that may be briefly summed up as follows: True bromoform has the sp. gr. 2.904, and congeals at  $+8^{\circ}$ . Under the influence of light and air it soon changes with development of a red color; but this change does not occur if the bromoform contains 1 per cent. of alcohol, and if it is kept in well-filled bottles and in a dark place. Such a bromoform has the sp. gr. 2.885, congeals at  $+7^{\circ}$ , and boils at about  $148^{\circ}$ , and is the kind that is now being supplied by responsible manufacturers. Heretofore bromoform of sp. gr. 2.830 has been accepted by some authorities as pure, but such in reality contains 4 per cent. of alcohol, a percentage that is

much greater than is necessary to its preservation.—Pharm. Centralh., Dec. 12, 1895, 705-706.

*Iodoform—Action on 3-Naphthol under the Influence of Sunlight.*—W. C. Schuyten observes that if the ethereal solutions of 1 mol. iodoform and 5 mol. of  $\beta$ -naphthol are mixed and exposed to sunlight in a closed vessel, the mixture gradually becomes red, then black, and finally bronze colored crystals are separated. These are only sparingly soluble in all the ordinary solvents, with the exception of chloroform, and melt at  $250^{\circ}$  to  $251^{\circ}$ . The substance is very reactionable and readily splits off its iodine atoms, its composition being  $C_8H_7$ ,  $CHI$ ,  $CO$ ,  $CI$ ,  $C_8H_7$ ,  $CH_3$ .—Pharm. Centralh., March 26, 1896, 196; from Chem. Ztg., 1895, No. 96, 2164.

*Iodoform and Nosophen—Comparison of Antiseptic Action.*—According to Loeb the antiseptic iodine compounds may be divided into two groups: 1, into those that give off iodine in contact with the organism, and 2, into those which are eliminated unchanged. To the first group belong iodoform, iodol, europen, aristol, etc., to the second the compound introduced by the author under the coined name "nosophen" (tetraiodphenolphthalein) and its sodium salt bearing the coined name "antinosin." While in the case of iodoform the iodalbuminates, formed by the liberated iodine, are carriers of the antiseptic property, the activity of nosophen is due to its direct combination with the albumin, forming compounds which are absolutely non-toxic, while those formed by the free iodine liberated from the iodoform give rise to the observed phenomena of iodoform intoxication.—Pharm. Centralh., Dec. 1895, 733; from Wien. Med. Bl.

*Iodoform—Removal of Odor from the Hands, Utensils, etc.*—Taking advantage of the production of the odorless compound of iodoform and hexamethyltetramine ("urotropine"), which Ed. Konteschweller believes to be identical with the recently introduced "iodoformin" (which see), he recommends that the unpleasant odor be removed by moistening the hands, utensils, etc., that have come in contact with iodoform, with an alcoholic solution of hexamethyltetramine, and drying them rapidly with a cloth.—Pharm. Centralh., Nov. 21, 1895, 669.

*Methyl Alcohol—Action of Halogens.*—T. Schützenberger has studied the action of the halogens upon methyl alcohol. The action of chlorine in the cold is more powerful in proportion as the methyl alcohol is more diluted with water. Chloro-methyl alcohol is formed, which by the influence of hydrochloric acid is converted into an oxide of dichlor-methyl, and this in contact with water is decomposed with formation of formic aldehyde and hydrochloric acid. When heat is employed no ether is formed, methylal and methyl chloride being produced, while oxides of carbon are given off.

Bromine has practically no action upon methyl alcohol below  $130^{\circ}$  to  $150^{\circ}$  at which methyl bromide is formed chiefly, together with carbon dioxide.

If bromine is not in excess, formic acid and carbonic oxide may also be detected.

Iodine requires a still higher temperature— $180^{\circ}$  to  $200^{\circ}$ —to act upon methyl alcohol, with formation of carbon dioxide, hydriodic acid, and a little methyl iodide. At the same time some

*Methyl oxide* is formed, and the process is readily adapted to the production of large quantities of this ether, the quantity of iodine required being about 5 per cent. of the weight of the alcohol. The methyl oxide formed contains traces of methyl iodide.—Pharm. Journ., July 27, 1895, 74; from Compt. rend., cxxi., 130.

*Methyl Alcohol—Use for the Separation of Arsenic from other Elements.*—See *Arsenic*, under "Inorganic Chemistry."

*Methyl-Nitric Ether—Preparation.*—According to Delepine methyl-nitric ether may be prepared as follows: 100 Cc. concentrated sulphuric acid and 150 Cc. nitric acid of 36 per cent. are mixed and the mixture is allowed to cool to  $12^{\circ}$ ; then 150 Cc. of 98 to 99 per cent. methyl alcohol and 50 Cc. of sulphuric acid are mixed gradually, so that the temperature of the mixture is not raised above  $12^{\circ}$  to  $14^{\circ}$ . The methyl sulphuric acid so obtained is then added gradually to the mixture of sulphuric and nitric acids under refrigeration, this mixture is transferred to a tall cylinder of 1 liter capacity, and 100 Cc. of sulphuric acid is added in one portion with stirring. The temperature now rises to  $20^{\circ}$ , and, after a short time, the ether separates upon the surface of the acid fluid, the ether being removed by the aid of a separating funnel, washed with alkali, and rectified (by distillation? Rep.). So obtained methyl-nitric ether is pure, and distills at  $66^{\circ}$ .—Pharm. Centralh., Jan. 16, 1896, 30; from Bull. Soc. Chim., 1895, 1044.

*Benzoyl Carbinol—Preparation and Character of its Salicylic Acid Derivative.*—The resemblance of benzoyl-carbinol to the sugars was first recognized by Zinke (1881) in its behavior to Fehling's solution, and the compound has since been the subject of study by E. Fischer (1892), and more recently (1895), by Victor Fritz, who have determined that this ketone alcohol is distinguished from the sugars by methylating it with methyl-alcohol and hydrochloric acid, a dimolecular product being formed, whereas, in the case of sugars easily hydrolized glucosides of mono-molecular structures are formed. With the view to contributing some further information concerning this interesting compound, Arnold Voswinkel has now prepared its salicylic acid ester, a derivative possessing extraordinary reaction ability, and offering a practical material for the further study of benzoyl-carbinol. This derivative,

*Benzoylmethyl Salicylic Acid Ester* was obtained by heating equal molecules of sodium salicylate and *o*-bromacetophenone for two hours upon a water bath. The hot solution is filtered off from sodium bromide formed,

and the solution is allowed to crystallize. It forms splendidly developed, long, colorless needles, which after repeated crystallizations from alcohol melt at  $113^{\circ}$  to  $114^{\circ}$  C., are insoluble in water, but dissolve at the ordinary temperature in 40 to 50 parts of alcohol or ether. Its alcoholic solution assumes a violet color on addition of ferric chloride. Upon heating the compound with dilute alkalis, benzaldehyde is split off. Fehling's solution is completely reduced by the compound at the ordinary temperature, and this reaction distinguishes it decidedly from the phenyl- and naphthol-ethers of benzoylcarbinol, which are without action upon Fehling's solution even when heated. The authors have also prepared from this ester the oxime and the hydrazone. The new compound is introduced commercially under the coined name

*Salhyphon*, and the author communicates the results of some physiological experiments made at his request, which seem to point out that, aside of slight antiseptic action, it possesses no therapeutic value.—Pharm. Centralh., Feb. 20, 1896, 103-105.

*Trimethylene Glycol—Occurrence as a By-Product in Glycerin Manufacture.*—Some difficulty having been experienced by a soap-making firm in obtaining their glycerin of the required commercial gravity, samples were submitted to Arthur A. Noyer and Willard H. Watkins, who found it to contain a considerable quantity of trimethylene glycol, a substance boiling at  $214^{\circ}$ , and having a sp. gr. of 1.0526. As to its origin, there is little doubt that it was produced by fermentation of the glycerin. Refuse house-fat formed a considerable part of the soap stock, and the glycol had probably been produced in the fat by spontaneous saponification and subsequent fermentation of the glycerin. It is important to note in this connection that the presence of glycol is a source of danger in the manufacture of nitroglycerin, since it reacts with nitric acid with explosive violence.—Amer. Jour. Pharm., Dec. 1895, 633-634; from Jour. Amer. Chem Soc., 17, 890.

*Formaldehyde—Review of Its Synthetic Reactions.*—Dr. Altschul, in view of the increasing industrial importance of formaldehyde as a source of numerous synthetic compounds, reviews the more recent synthetical reactions that have been published. It is well known that Loen obtained by heating formaldehyde with lime water a fermentable sugar, *α-acrose*, belonging to the hexan resins, and this was followed by Tollens, who obtained a number of polyvalent alcohols by the action of aliphatic aldehydes or ketones upon formaldehyde in presence of lime water. Recently two new polyvalent alcohols have been added to those previously described, the one obtained from isopropylaldehyde being a bivalent alcohol which has been designated as *pentaglycol*, the other, obtained from acetone, a septivalent alcohol, being an anhydride, and named *anhydroenneaheptite*. Similar to these reaction products are those of formalde-

hyde upon the nitroparaffins studied by Henry, an alcohol analagous to the pentaglycol before named having been produced from nitroethane. Then, similar to the compounds which are formed by the action of acetaldehyde upon different alcohols, and have received the general name of *acetals*, formaldehyde is capable of producing a series of compounds from the alcohols which are described by Schultz and Tollens as *formals*. These authors have obtained the formals of mannit, sorbit, adonit, erythrit, pentaerythrit and glycerin. Mannit and sorbit yielding triformals, admit a diformal, and glycerin a mono-formal. But the most interesting reaction that has hitherto been observed is that between formaldehyde and the amido-compounds in *acid* solutions. Several reaction compounds obtained by the reaction of formaldehyde and aniline in alkaline solution have before been described, but if the action is caused in presence of acid, there are three different compounds produced, one of which contains oxygen. P. N. Raikow (Chem. Ztg. 1896, 306,) obtained these compounds by heating an aqueous solution of hydrochloride of aniline to boiling and adding an excess of 40 per cent. formaldehyde solution. The solution became first yellow, then wine-red. Upon treatment with solution of potassium hydrate the mixture becomes decolorized, and an amorphous deposit forms, which consists of a mixture of the three bodies referred to, among which the new synthetic base containing oxygen appears to preponderate. This new compound has the composition  $C_{15}H_{16}N_2O + 2H_2O$ . It is not decomposed by boiling with alkalis or acids, and forms salts—chloride, sulphate and nitrate—which are insoluble in water,—Pharm. Centralh., April 30, 1896, 263–265.

*Formaldehyde—Microscopic Determination.*—G. Romijn recommends the determination of formaldehyde by its ready conversion into

*Hexamethylenetetramine* ("urotropine") and the identification of this base by several microscopic reactions. A few drops of the fluid supposed to contain formaldehyde, or a drop of distillate obtained from it, is placed upon a slide, a drop of ammonia solution added, and evaporated to dryness on a water bath. In presence of formaldehyde a residue of regular crystals of hexamethylenetetramine is observed under the lens. The crystals are redissolved in a drop of water, and portions of it examined under the microscope after addition of the following reagents :

*Mercuric chloride* in excess, produces regular three-or-more-rayed stars, subsequently octahedrons, which come out strongly in 1 : 10,000, and are still handsome in 1 : 100,000.

*Mayer's Reagent* and a trace of hydrochloric acid, produces hexagonal six-sided stars, which come out distinct in 1 : 10,000.

*Platinum chloride* produces regular octahedrons, somewhat deeper in color than the crystals of ammonia-platinum chloride, but otherwise resembling them very closely, which are still faintly visible in 1 : 10,000.

*Phosphomolybdic acid* produces handsome right-rhombic crystals, and



*Potassium iodide*, and *Bismuth-potassium iodide*, with traces of hydrochloric acid, produce yellow regular octahedrons, decided in 1 : 1000.—Pharm. Centralh., Oct. 31, 1896, 630; from Med. Tijdsch. v. Ph. Chem. en Tox., 1895.

*Formaldehyde—Reactions.*—T. H. Lee calls attention to some reactions of formaldehyde, as represented by formalin (40 per cent. formaldehyde), from Schering. Potassium permanganate is immediately reduced, the formaldehyde being oxidized to CO<sub>2</sub> and water. Hot ferric chloride solution is deepened in color, and ammonia then precipitates basic ferric formate. Ferricyanide is reduced to ferrocyanide. Hot Fehling's solution is rapidly reduced by formaldehyde. Ammoniacal copper sulphate *per se* is not reduced, nor is mercuric chloride; but alkaline mercurio-potassium iodide is immediately reduced to metal in the cold.—Chem. News, Sept. 27, 1895, 154.

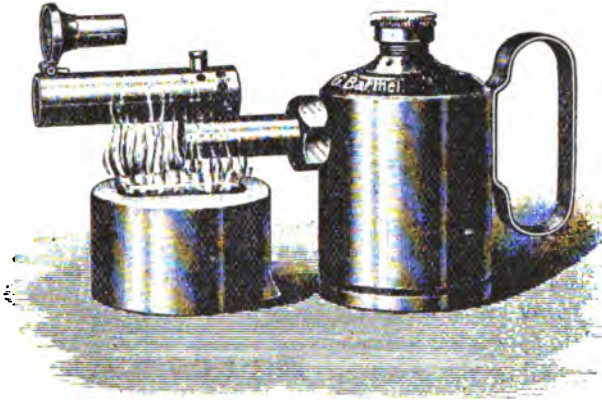
*Formaldehyde—Preparation of Pure Gas.*—Brochet obtains pure gaseous formaldehyde by passing hot gases—the best being nitrogen or carbonic acid—through *trioxymethylene* (CH<sub>2</sub>O)<sub>3</sub>. The method is free from danger, the apparatus being placed without the room to be disinfected, which is easily freed from the gases by subsequent airing. The incomplete combustion of methyl-alcohol always gives rise to a peculiar odor.—Pharm. Centralh., March 19, 1896, 179.

*Formaldehyde—Use as a Disinfectant.*—Recent experiments seem to establish that formaldehyde is a cheap and efficient disinfectant, and Dieudonné reports very satisfactory results in a report of the Imperial (German) Health Department. It possesses the advantage over other gaseous disinfectants in that the sp. gr. of the vapor is so near that of air that it readily and equally mixes with it in the space to be subjected to its influence, and that it is, unlike chlorine or sulphurous acid, absolutely non-corrosive. The apparatus necessary for its production from methyl alcohol is comparatively simple. It consists of a Barthel's soldering lamp, which in this case is supplied with methyl alcohol instead of ordinary alcohol, while some plaited platinum wire is inserted in the outlet producing the soldering flame. After the frame has been produced by the vaporization of the methyl alcohol in the usual manner, the platinum is brought to a red-heat, inserted, and the flame is then extinguished. The formation of vapor of formaldehyde begins and continues until the methyl alcohol is completely consumed.—Pharm. Centralh., Oct. 24, 1895, 612-613.

*Formaldehyde—Production for Disinfection by Means of Barthel's Lamp.*—In place of the soldering lamp, heretofore recommended, G. Barthel has now constructed a lamp specially for the production of formaldehyde from methyl alcohol, which is shown by the accompanying cuts (Figs. 68 and 69.) The lamp is filled with methyl alcohol, the necessary quantity being that which the cup (shown inverted in Fig. 68,

and slipped over the body of the lamp in Fig. 69) is capable of holding. The methyl alcohol is carried by the aid of a wick into the lower horizontally attached tube, where it is initially vaporized by the flame of a small quantity of methyl alcohol poured into a groove or depression in the

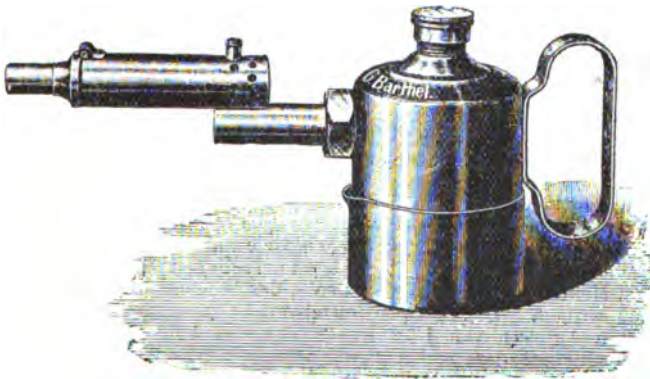
FIG. 68.



Barthel's Lamp.

inverted cup. The cup at the extremity of the upper horizontal tube is kept open (see Fig. 68), so that air may circulate through the small holes at the other extremity. So soon as the vapor of methyl alcohol enters this

FIG. 69.



Barthel's Lamp.

upper tube, it becomes ignited and burns *inside* of the upper tube. The cup is then closed, as shown in Fig. 69, when slow combustion continues in the upper tube, with constant production of formaldehyde, until the supply of methyl alcohol is completely consumed.—Pharm. Centralh., May 21, 1896, 327.

*Formaldehyde—Practical Application as a Disinfectant.*—G. Roux and A. Trillet have made experiments under practical conditions, in enclosed spaces of capacity varying from 70 to 1400 cubic meters, to determine the efficiency of the vapor of formaldehyde as a disinfectant. They found that pathogenic germs could thus be absolutely destroyed when freely exposed to the aldehyde, and that the dust in the air and on the walls of rooms was at the same time thoroughly sterilized. The action of the aldehyde appears to be exercised immediately and simultaneously in all parts of the enclosed space. Care must be taken in employing this process to avoid the escape of aldehydic fumes, on account of their irritating properties, but there is no risk from the formation of carbon monoxide.

Dr. F. E. Bosc has also experimented in the same direction, and fully confirms the above results. He shows that even *Bacillus tuberculosis* can be destroyed, either in the dry or moist state, by the aldehyde fumes. He suggests that all objects to be disinfected should be as fully exposed to the fumes as possible, and that after disinfection free currents of air should be admitted for a quarter of an hour before the room is entered, and the windows to be left open. After thoroughly ventilating for two days, all traces of the formaldehyde odor will have disappeared, and it will be found that objects in the room are uninjured as regards their structure and color.—Pharm. Jour., June 17, 1896, 504: from Ann. de Inst., Pasteur, x., 283 and 299.

*Formaldehyde—An Efficient Remedy in Gonorrhœa.*—Orloff recommends solutions of formaldehyde up to 5 per cent. as efficient in the treatment in gonorrhœa. On account of its energetic action it may be used as injection in the primary and most violent stage of the disease, when the use of other agents would be precluded.—Pharm. Centralh., Jan. 2, 1896, 10; from Wratsch, 1895.

*Formalin—Value as a Preservative.*—E. M. Holmes draws attention to the known and possible advantages of formalin as a preservative agent. A 1 or 2 per cent. solution has been found to answer admirably for preserving vegetable products, the fresh appearance of the plant not being destroyed in some instances. Its cost being only about equal to that of methylated spirit, it possesses great advantages from an economical standpoint, and Mr. Holmes suggests its use for the general preservation of museum specimens. It is said to be used industrially as a milk preservative.—Pharm. Journ., Aug. 3, 1895, 111.

*Formalin—Value as a Preservative of Histological Specimens, etc.*—J. Hornell has experimented with formalin as a preservative medium for marine animals, and finds that for histological details simple immersion in a strong solution gives fair results, though better results are obtainable by prior fixation. Neither method, however, is so satisfactory as the ordinary plan of fixing and grading into spirit. The addition of three per cent. of formalin to aqueous staining fluids used in microscopical work, was found

to obviate any risk of the maceration of objects placed therein, and a three per cent. solution replaces pure water with advantage in washing out ordinary fixatives. Loss of color in preserved objects proceeds more slowly in formalin than in spirit, but in time the result is the same in both cases. For the majority of purposes, however, formalin is superior to spirit in the results obtained, and it is of course much less expensive.—Pharm. Journ., Dec. 28, 1895, 536–537; from Natural Science, vii., 416.

*Formalin—Incompatibles.*—Formalin is incompatible with ammonia, the alkaline solutions, and reduces metallic solutions. Gelatin becomes insoluble through its action.—Amer. Drugg., April 25, 1896, 251.

*Formalin.*—Application of its solution to facilitate the *Rapid Staining of fresh tissues*, which see under "Microscopy"

*Carbolic Acid—Liquefaction and Crystallizing Point of Variable Admixtures with Water.*—Van Ledden Hulsebosch has made various mixtures of carbolic acid and water, by weight, and finds such mixtures to crystallize under the following conditions:

100 parts carbolic acid and 20 parts of water	crystallize at	2.2° C. = 36° F.
100 " " 15 " " "		4.5° C. = 40° F.
100 " " 14 " " "		6.0° C. = 42.8° F.
100 " " 13 " " "		7.5° C. = 45.5° F.
100 " " 12 " " "		9.0° C. = 48.2° F.
100 " " 11 " " "		10.2° C. = 50.4° F.
100 " " 10 " " "		11.6° C. = 53° F.

The results corroborate the observations communicated ten years ago by Peter Boa to the North British Branch of the Pharm. Society, and point out that if acid carbol. liq. (B. P.) were made to contain 20 per cent. of water it would not give trouble during cold winters.—Chem. and Drugg., Jan. 4, 1896, 14; from Pharm. Weekblad.

*Carbolic Acid—Action Upon Aluminum.*—It having been proposed to employ aluminum flasks as containers for carbolic acid, particularly for army use, Zmerzlikar contradicts the utility of aluminum for this purpose, since that metal is readily dissolved by phenol under lively and even violent reaction and generation of hydrogen.—Pharm. Centralh., Aug. 22, 1895, 474.

*Carbolic Acid—Camphor a Possible Antidote.*—Jefferson D. Persse observes that a combination of carbolic acid and camphor in the manner suggested in the U. S. Dispensatory of 1880, in the proportion of 2 parts of camphor to 1 part of carbolic acid, makes a preparation similar in appearance to "campho-phenique." In this the camphor overcomes or neutralizes the caustic properties of carbolic acid, a fact which induces him to call attention to the possible utility of camphor as an antidote to carbolic acid.—Merck's Rep., Sept. 15, 1895, 377.

*Beechwood Creosote—Variability of the Article Supplied.*—Freyss states

that in different samples of beechwood creosote the amount of guaiacol varies from 3 to 30 per cent., and the cresol from 10 to 40 per cent., accompanied by a very variable amount of monophenols. In order to obtain a definite physiological action it is therefore necessary to subject the creosote employed to a critical examination. The author suggests that beechwood creosote should only be employed if it be visibly darkened on prolonged exposure to light, and possesses an agreeable aroma somewhat resembling vanilla. Fractional distillation of the sample should be conducted, treating 100 Cc. in a fractioning flask of 125 Cc. capacity, and collecting the fractions in a graduated receiver. This distillation should be very regular, drop by drop, and should take place between  $200^{\circ}$  and  $220^{\circ}$  C. The author finds that the specific gravity of the fraction distilling between  $200^{\circ}$  and  $210^{\circ}$ , which contains the greater part of the guaiacol, gives a reliable indication of the amount of that body contained in it. In the samples examined the guaiacol content rose from 10 to 36 per cent. as the specific gravity increased from 1.077 to 1.090; figures which confirm those of other observers.—Pharm. Journ., May 30, 1896, 422; from Monit. Scientifique.

*Cresol—Method of Valuation in the Crude Commercial Article.*—Dr. Schneider uses the colorimetric method, previously described by him, for the valuation of crude cresol. As a standard for comparison he uses a solution of 1 Gm. pure tricresol in 100 Cc. of distilled water. To make the comparative test, 1 Gm. of the crude cresol is dissolved in 100 Cc. of water, and as much powdered calcium oxide as will go upon the point of a knife (? Rep.) is added; after mixing well, 1 Cc. of this mixture is heated with 5 Cc. of diluted nitric acid on a water-bath for five minutes, the mixture poured into a tall cylinder, ammonia is added in excess, and the volume is made up with distilled water to 500 Cc. Now treat 0.85 Cc. of the solution of pure tricresol in the same manner, and having brought the mixture to 500 Cc., compare the color of the two solutions. This should be identical in intensity if the crude cresol is up to the minimum requirement, which is that it should contain at least 85 per cent. of pure cresol.—Amer. Drugg., Oct. 25, 1895, 252; from Rep. Soc. Germ. Natural. and Phys., Sept., 1885.

*Guaiacol—Anæsthetic Value.*—Lucas-Championiere employs guaiacol as a local anæsthetic in form of a 10 per cent. solution in olive oil. Applied to burns it relieves the pain completely. Injected subcutaneously, it approximates in its effect to cocaine; anæsthesia is produced slower, but is more persistent.—Pharm. Centralh., Oct. 25, 1895, 617.

*Thiophen—Determination in Commercial Benzol.*—Denigés determines thiophen in commercial benzol by means of a solution of mercuric sulphate prepared as follows: 50 Gm. of mercuric oxide are dissolved by the aid of heat in 200 Cc. of pure sulphuric acid and 1000 Cc. of distilled water.

When 1 Cc. of thiophen is heated with 200 Cc. of this reagent, a heavy white precipitate of basic

*Mercuri-thiophen Sulphate*, is produced, a permanent compound, which is insoluble in water and other ordinary solvents; but an excess of sulphuric acid dissolves it, the solution subsequently becoming turbid and red. The addition of a few drops of solution of isatin in sulphuric acid occasions no apparent change, but on heating the liquid now to  $55^{\circ}$ , the blue indophenine reaction becomes evident, and becomes intense at  $70^{\circ}$ . If alloxan or alloxanthin is used in place of isatin, the liquid at  $60^{\circ}$  becomes blue-black. Basic mercuri-thiophen sulphate dissolves in excess of hydrochloric acid with separation of thiophen, which may be collected by distillation.—Pharm. Centralh., July 4, 1895, 388; from Rép. de Pharm., 1895, 157.

*Iodophenine—Incompatibles*.—Iodophenine is decomposed by water, iodine being liberated. Liberating iodine very easily, it should not be mixed with any body which has a strong affinity for that halogen.—Amer. Drugg., April 25, 1896, 251.

*Amygdophenine—Derivation*.—In "Merck's Jahres Bericht" a derivative of *p*-amidophenol, analogous to phenacetin in constitution, is described under the name "Amygdophenine." To produce this new compound, one atom of hydrogen in the amide group is replaced by a mandelic acid residue and one atom of the hydroxyl group by ethyl carbonate. It is described as a greyish-white voluminous crystalline powder, very sparingly soluble in water, and is said to be serviceable in rheumatic affections of the joints, to be without objectionable action, to be anti-neuralgic, and may be given in daily doses of 92 grains. It is of little value as an antipyretic.—Pharm. Journ., Feb. 29, 1896, 162.

*Resorcin—Decomposition Products*.—By heating equal parts of resorcin and zinc chloride together on an oil-bath, E. Grimaux obtained two colorless, crysalline bodies, melting at  $225^{\circ}$  and  $261^{\circ}$  respectively. The body having the lower melting point, in the formation of which only about 1 per cent. of the resorcin used is concerned, proved to be identical with umbelliferone or methoxycoumarin,  $C_9H_6O_3$ . The body melting at  $261^{\circ}$ , in the formation of which about 5 to 6 per cent. of the resorcin is concerned, has a composition indicated by the formula  $C_{24}H_{18}O_6$ , is described as constituting a resorcinic ether analogous to the poly-ethylenic alcohols, but its constitution remains to be determined. Like the first body, it occurs in needles. They are insoluble in water, soluble in alcohol, ether, acetone, and toluene, and sublime with partial decomposition in long needles resembling those of phthalic anhydride, slightly soluble in ammonia, but more so in potash, and not forming fluorescent solutions.—Pharm. Journ., July 27, 1895, 74; from Comp. rend., cxxi., 88.

*Resorcin—Action of Zinc Chloride*.—By the action of zinc chloride

upon resorcin, E. Grimaux obtains a substance which is identical with umbelliferone,  $C_9H_6O_3$ . It is fusible at  $225^\circ$ , forms small colorless needles soluble in alcohol and acetone, sparingly soluble in ether, and soluble in 100 p. boiling water. A second substance is formed, which has the composition  $C_{24}H_{18}O_8$ , is fusible at  $264^\circ$ , and is insoluble in water, but soluble in alcohol, acetone, and ether.—Chem. News, Aug. 2, 1895; from Compt. rend., July 8, 1895.

*Resorcin—Incompatibility with Spirit of Nitrous Ether.*—Dr. Walter G. Smith calls attention to an incompatibility observed in a lotion prepared according to the following prescription: Hydrargyri perchlor, gr. iv.; resorcin, ʒi.; spir. chloroformi, spir. aeth. nitr. āā f. ʒ ij. The lotion turned a dark red color, and produced severe irritation upon the skin of the patient. The author considers it possible that a red nitro-compound is formed, analogous to the green nitroso-compound formed by the interaction of antipyrine and nitrous ether.—Pharm. Jour., Aug. 3, 1895, 98.

*Soziodol-Sodium—Value in the Treatment of Diphtheria.*—Dr. S. Schwarz has used soziodol-sodium with success in the treatment of diphtheria. The remedy is used in admixture with other substances, varying according to the age of the child. For children two years old: soziodol-sodium, 3; washed sulphur, 6; saccharin, 1 gram. For children 2 to 4 years old: equal parts of soziodol-sodium and sulphur, with a little saccharin; and for children over 4 years old, soziodol-sodium alone, with a little saccharin, is used. Insufflation is effected by means of a long paper tube through which the powder is blown into the mouth, after the tongue has been depressed by means of the handle of a spoon. The paper tube is burnt immediately after its use, and a new one substituted each time. In addition to this treatment, Dr. Schwarz gives hourly, in tablespoon doses, a weak solution of potassium chlorate (1:125–180); and also as a tonic a decoction of cinchona with brandy or Malaga wine.—Pharm. Centralh., Dec. 12, 1895, 717; from Wien. Klin. Wochenschr., 1895, No. 43.

*Glycerose (Glyceric Aldehyde)—Production.*—Fonzes-Diacon has obtained glycerose or glyceric aldehyde in considerable quantity by the action of mercuric chloride upon glycerin. A mixture of these gradually heated to  $150^\circ$  or  $160^\circ$  C. in a very capacious retort yields a distillate containing the aldehyde, acrolein, and chlorinated products; this is neutralized with soda and shaken with benzene to remove some oily substances. The clear, yellowish liquid remaining consists of glyceric aldehyde. It forms with phenyl-hydrazine an osazone, which is soluble in alcohol, very sparingly soluble in water, and melts at  $131^\circ$  C. The aldehyde has great reducing powers, and is applicable for silvering glass, as well as for photographic purposes as a developer.—Pharm. Jour., Feb. 1, 1896, 83; from Bull. Soc. Chim. de Paris, xxiii., 862.

*Nitroglycerin—Reliable Method of Assay.*—His attention having been called to the surprisingly variable effects produced by certain nitroglycerin preparations in the market, Charles Rice has examined the methods heretofore proposed for the assay of nitroglycerin with the view to determining one of uniform reliability. Notwithstanding the unfavorable comments of Allen upon the method of saponification proposed by Koettsdorffer, the author finds the process of saponification to be quite suitable for the assay, under proper modifications, and proposes the following as yielding reasonably uniform and satisfactory results: Assuming that a solution supposed to contain 10 per cent. of nitroglycerin is to be assayed, into an Erlenmeyer flask introduce 20 Cc. of decinormal alcoholic potassa, heat it moderately, and then add, in several portions, 10 Gm. of the nitroglycerin solution, finally rinsing the vessel which had contained the latter with a little absolute alcohol and adding this to the mixture. Test the liquid with litmus paper to ascertain whether it is still alkaline. If it is not, it is evident that some undecomposed nitroglycerin is still present, and another portion (10 Cc. or more, carefully measured from a burette) of the volumetric alkali must be added and considered in the final calculation. Place the flask on a water bath and heat it until the contents begin to boil. Then stopper it and set it aside to cool. Now pour off the clear pale-colored solution from the colored crystalline crust adhering to the bottom of the flask, wash the latter with alcohol, add the washings to the decanted liquid, then a little phenolphthalein solution, and determine the excess of alkali with decinormal acid. Let it be assumed that 13.5 Cc. of the decinormal alkali had been consumed in the decomposition of the nitroglycerin, the amount of the nitroglycerin would be  $13.5 \times 0.0755267 = 10.1961$  Gm.; that is, 10.196 per cent.

The reaction being between three molecules of KOH and one molecule of nitroglycerin, one molecule of KOH, or 55.99 parts, corresponds to one-third molecule of nitroglycerin, or 75.5267 parts, from which the above factor is deduced.

An examination of two specimens of nitroglycerin solution, supposed to contain 10 per cent., gave by this method 14.42 and 13.76 per cent. nitroglycerin, and when the first of these was reduced in accordance with these results to a theoretically 1 per cent. solution, two assays made of the later gave respectively 0.992 and 1.013 per cent., proving the reliability of the method. Six further specimens, supposed to contain 1 per cent. of nitroglycerin, were also examined by the method, and found to contain respectively: 1.76, 1.81, 1.18, 1.19, 1.39 and 1.43 per cent. of nitroglycerin.—*Amer. Drugg. and Pharm. Rec.*, July 10, 1895, 6-7.

*Glycerophosphates—Preparation.*—G. Delage describes a more rapid method of preparing glycerophosphates of lime than that of Porte and Prunier (see *Proceedings*, 1895, 686), which takes several days for completion, as follows: Put into a suitable flask 100 grammes of 60 per cent.



phosphoric acid and 150 grammes of glycerin. Fix a double-perforated cork into the flask, one hole with a thermometer in it, the other with a safety tube as a vent. Then heat with a Bunsen over gauze. The mixture begins to boil at  $120^{\circ}$  C., and turns slightly pale, darkening until  $160^{\circ}$  is reached, and between that and  $190^{\circ}$  it becomes dark brown, syrupy, and gives off acrolein vapor. The heat is then removed and the mixture allowed to cool, when it becomes viscous. Next the mass is mixed, about 30 grammes at a time, with a mixture of 50 grammes of precipitated chalk and 250 grammes of water, the mixture is well stirred to promote effervescence, and at the end of six hours it is filtered. From the filtrate the calcium glycerophosphate is precipitated by the addition of alcohol, dried partially with bibulous paper, and finally over sulphuric acid in a bell jar.

The doses of the various salts,\* soda, lime, potash, magnesia—is 5 to 15 gr. per day, and of the iron salt 3 to 5 gr. per day. The most characteristic reactions of the glycerophosphates are the immediate precipitate with ammonium molybdate, a precipitate with silver nitrate soluble in excess of water, and a white precipitate with lead acetate soluble in acetic acid.—Chem. and Drugg., May 23, 1896, 749; from Les Nouv. Remèdes.

#### FIXED OILS.

*Fixed Oils—Purification by means of Algosin.*—Villon, being of the opinion that pure oils should never become rancid, has sought to purify commercial oils by removing all mucilages, albuminoid matters, fatty acids, coloring substances, etc., by a process of filtration, using in connection with his process a commercial product named

*Algosin*, which resembles "algin," and, like algin, is obtained from marine algæ. It resembles tragacanth in appearance, and combines with alkalies to form non-crystallizable salts, which look like gelatin and are very soluble. A concentrated solution of algosin, agitated with olive or similar oil for some time, frees it completely from foreign substances, a deposit forming that can be filtered out after the oil has stood for twenty-four hours. After treatment the oil is said to be practically unalterable, a sample remaining free from rancidity or disagreeable taste after being exposed to the air for more than twelve months. Comparative results with ordinary and sterilized oils are given, which in essentials correspond with the following obtained with olive oil. The original acidity was 1.23 per cent., and in fifteen months it had increased to 6.18 per cent. The "sterilization" by the method mentioned reduced the original acidity to 0.01 per cent., and this increased after fifteen months exposure to not more than 0.03 per cent.—Pharm. Jour., Nov. 30, 1895, 453-454; from Rev. Chem. Industr., through Jour. de Pharm. (6) ii., 423.

*Fats—Simple Method of Determining the Melting Point.*—The following

\* These are described in Proceedings 1897, 686-687.

simple method for determining the melting point of fats is recommended by Van Ledden-Hulsebosch as being particularly serviceable in cases where the quantity of material is insufficient for the usual method of determination in capillary tubes. The substance is placed on a thin capsule of aluminum, shaped like a watch glass, and the capsule is floated on the surface of water contained in a beaker, into which a very sensitive thermometer is placed. Heat is then applied, and the contents of the aluminum capsule are observed through a hand magnifying glass, through which they present a perfectly opaque appearance; but at the moment of melting the fat glistens and becomes transparent. Comparative experiments have determined this method to be quite as accurate as that with capillary tubes, and at the same time it possesses the advantage of great simplicity and convenience.—Pharm. Centralh., April 16, 1896, 231-232.

*Fats—Characteristic Reaction.*—Vreven observes that when concentrated sulphuric acid is caused to act upon fats in the presence of powdered cane sugar upon a white surface, a yellow or brown coloration is produced, which after ten minutes changes to a rose-red and eventually passes to lilac, which color remains for a relatively long time. Solid fats should be heated slightly. Among the numerous oils examined, only croton and nut oil fail to give the color reaction, while in the case of lanolin it was difficult to obtain the final lilac tint. Volatile oils, wax, vaselin, and glycerin, only gave the reaction which is produced by sulphuric acid alone. Neither dextrose or lactose will replace saccharose for this reaction.—Pharm. Centralh., April 2, 1896, 212; from Annal. de Pharm., 1896, 9.

*Fats—Addition Products with Sulphur.*—Dr. Julius Altschul describes his studies and experiments made to determine the formation of compounds of fats with sulphur on a more rational basis than that which has been employed for several centuries, and under the direction of various pharmacopœias, in making the so-called "balsamum sulphuris." In these formulas there is not alone a variation in the proportions of sulphur and oil employed, but likewise in the kind of oil, some of the formulas directing almond oil, others olive, linseed or walnut oil. The author finds that the property of taking up and combining with large quantities of sulphur is shared by the oils of the unsaturated carbohydrogen series, while saturated fats, such as stearic acid, for instance, take up sulphur with difficulty only and part with it again when subjected to the action of solvents, such as ether, oil of turpentine, etc. On the other hand the unsaturated fats which easily form addition products with the halogens—chlorine, iodine, bromine—take up large, and as the author has now found, definite quantities of sulphur, forming true addition products from which the sulphur can not again be separated by the simple action of solvents. Thus the unsaturated oleic acid, when heated with about 12.5 per cent. of sulphur at 140° C. for several hours, apparently combined completely with the latter, forming a liquid which remained clear when cooled. Only a very

small percentage of sulphur, 0.08 per cent., was separable by solvents, and the compound formed was by analysis determined to contain 11.2 per cent. of sulphur, the theoretical percentage being 11.35 per cent. in a compound of the composition  $C_{18}H_{34}SO_2$ . It is, furthermore, found that the liquid fats, such as linseed, rape, olive, cotton, cod-liver, and poppy oils, all of which contain unsaturated compounds, are capable of forming definite addition compounds similar to that of oleic acid. By proper manipulation, and particularly observance of a proper temperature, these sulphurated oils may be saponified by alcoholic potash solution, the resulting sulphur soaps, which the author designates as

*Thiosapoles*, containing the sulphur in definite and chemical union with the fatty acids. These soaps may be made at low temperatures by adding a certain proportion of cocoanut oil. Thus, by heating together equal weights of cocoanut oil, of sulphurated linseed oil—obtained under the conditions above named—and of soda-lye of  $38^{\circ}$  B. at a temperature of  $25^{\circ}$  C., and allowing it to stand several hours, a soap of the character named is formed. Analysis of such a soap gave 2.96 per cent. of sulphur, or for the fat acids 4.0 per cent.; 4.4 per cent. being the calculated quantity.—Pharm. Centralh., Oct. 24, 1895, 605-612.

*Almond Oil—Presence of Emulsin.*—Van Ketel has determined by a number of experiments, which are described in detail in his original paper in Tijdschr voor Ph. Chem. en Tox. (July, 1895), that cold pressed oil of sweet almonds, even after rigid filtration, retained a small proportion of emulsin. The amount of hydrocyanic acid generated after addition of amygdalin by the emulsin retained in 100 Gm. of the oil required from 0.2 to 0.3 Cc. of  $\frac{1}{16}$  normal silver nitrate, and the fixed oil of apricot kernels contained similar quantities of emulsin.

While the quantities of albuminoids—among which are “enzymes,”—dissolved in fluid oils are extremely small, the author expresses the opinion that in the near future analytical methods will be devised which will enable by simple means the determination of the enzymes characteristic for the oils employed in preparing artificial butter.—Pharm. Centralh., Aug. 8, 1895, 456.

*Cotton Seed Oil—Process of Manufacture.*—Arthur R. Lewis communicates some interesting details respecting the manufacture of cotton seed oil, which, amounting to an annual product of 500,000 barrels in 1888, in 1893 reached 940,000 barrels. Before pressing the seed, it is “relinted” by passing it through a machine constructed to effect this purpose. They are then hulled by means of burr-stones set in such position that the hull is cracked without crushing the seed, and the hulls being separated by machinery from the endosperm, this is passed between heavy chilled rollers, which crushes it into a flat mass and ruptures the oil cells. The crushed mass is put through heaters for fifteen minutes, is then prepared for the press in the “cake-former,” and after the press bases have been

filled, is subjected to a pressure of 3,000 to 4,000 pounds per square inch by hydraulic pressure ; the entire process, from the beginning of the relinting to the end, occupying about forty-five minutes. The crude oil varies in color from a deep yellow to ruby-red, sometimes dark-brown, or even black. It is refined by shaking it with about one-tenth of its volume of solution of caustic soda of 12 to 15 per cent., which causes the precipitation of albuminous and coloring matter ; the precipitate is filtered off, the alkali remaining in the oil is washed out by repeated quantities of water containing a small quantity of acid, and it is then run off into tanks to clarify, coming out neutral, of a bright lemon yellow color, and ready for the market. A ton of seed yields about 250 lbs. of oil, 30 lbs. of lint, 900 lbs. of hulls, 750 lbs. of cake meal, all of which find a market.—*Amer. Jour. Pharm.*, Jan., 1896, 42-45.

*Cotton-Seed Oil—Presence of a Sulphuretted Substance.*—J. Dupont observes that American food-fats containing cotton oil often become rancid, and in that state have a deceptive action with the silver nitrates. To determine the nature of the substance producing this action, he distilled cotton oil in a strong current of steam, and obtained a watery distillate having a disagreeable smell of a sulphuretted product. On successive treatment of this distillate with ether, a small quantity of oily matter was obtained, which was heated on the water-bath with nitric acid and potassium chlorate, the excess of acid driven off, and the residue taken up in water. The solution gave with barium chloride a strong precipitate of barium sulphate.—*Chem. News*, Oct. 25, 1895, 209 ; from *Bull. Soc. Chim. de Paris*, xiii-xiv, No. 13, 1895.

*Beech-nut Oil.—Percentage of Oil from the Seeds, Characters, etc.*—See *Beech nuts*, under "Materia Medica."

*Goose Grease—Value as a Penetrant Inunction.*—Dr. Langford Symes, in connection with the subject of animal oils to be adopted in the new British Pharmacopœia, speaks a good word for goose grease, which in his experience has proven valuable as an inunction in the treatment of bronchial affections and other ailments. As a basis for liniments, or the softer kinds of ointments, when the effect is desired upon the underlying tissues, he can conceive no better substance to "carry in" a drug into the deeper parts. It far exceeds lard in efficiency, and possesses far greater permeating qualities than vegetable oils. Its liability to become rancid is, in the author's experience, overcome to a great extent by the addition of some boric acid.—*Pharm. Jour.*, Aug. 3, 1895, 98 ; from *Dubl. Jour. Med. Science*.

*Lard—Detection of Vegetable Oils in Admixture.*—Ferdinand Jean states that vegetable oils added to lard increase the density, raise the iodine number, lower the melting point, the standard of fatty acids, and Koettstorffer's number, and diminish the optical deviation. With the oleo-refractometer all the vegetable oils reflect to the right hand of zero, hence

lards mixed with vegetable oils show a deviation less than  $-12.5$ , the normal deviation of pure lard. The additions of other animal fats change the density little, but lower the iodine number, raise the melting point, and the standard of fatty acids, increase Koettsdorffer's number, and the optical deviation of the oleo-refractometer beyond  $-12.5$ .—Chem. News, Feb. 14, 1896, 83; from Bull. Soc. Chim. de Paris, No. 15, 1895.

*Lanolin—Description of Several New Alcohols.*—Until recently only three alcohols occurring in lanolin have been determined: cholesterin, ischolesterin and ceryl alcohol. L. Darmstaedter and J. Lifschitz have now obtained from the alkaline washings of partially saponified lanolin two new unsaturated alcohols. *The first alcohol* has the composition  $C_{10}H_{20}O$ . It is insoluble in ether, but soluble in boiling alcohol, chloroform, or benzol, and redeposited on cooling. It melts at  $105^{\circ}$  to  $109^{\circ}$ , and congeals at  $107^{\circ}$  to  $105^{\circ}$ . It is a colorless, tasteless and odorless powder, and contains water of crystallization, which may be completely eliminated by maintaining a temperature of  $110^{\circ}$  for ten hours. It is hygroscopic.

*The second alcohol*,  $C_{11}H_{22}O$ , is soluble in ether, and was obtained in form of fine needles, which melt at  $82^{\circ}$  to  $87^{\circ}$ , and are not hygroscopic. A third,

*Lanolin alcohol*,  $C_{12}H_{24}O$ , was obtained by G. Marchetti, and evidently must be regarded as the next homologue in this series of alcohols. It is a white odorless powder, insoluble in ether, with difficulty soluble in cold alcohol, readily soluble in hot alcohol, and melts at  $102^{\circ}$  to  $104^{\circ}$ .—Pharm. Centralh., Mar. 19, 1896, 176; from Ber. d. D. Chem. Ges., No. 19, 1895, and Gazz. Chim. Ital., 25, 22.

*Lanolinic Alcohol—A Constituent of Lanolin.*—According to Marchetti, commercial lanolin contains a peculiar alcohol, to the extent of about 1 per cent., which remains undissolved when the lanolin is saponified by means of alcoholic solution of sodium hydrate by heating for 5 or 6 hours in a water-bath. Evaporating the alcohol, decomposing the residual soap with sulphuric acid, and extracting with ether, which removes fatty acids, cholesterin, ischolesterin and ceryl alcohol, the residual lanolinic alcohol is purified by solution in chloroform. It constitutes a white, odorless, amorphous powder, soluble in hot alcohol, in benzol, and in chloroform, but insoluble in ether. It melts at  $102^{\circ}$ – $104^{\circ}$  C., has a composition corresponding to the formula  $C_{12}H_{24}O$ , and is oxidized by chromic acid, forming

*Lanolinic Acid*,  $C_{12}H_{22}O_3$ , a white crystalline powder, insoluble in water and in petroleum ether, but soluble in ether, alcohol, chloroform and benzol. It melts at  $75^{\circ}$ – $77^{\circ}$  C. Its barium salt, containing one molecule of water of crystallization, is a white powder, which decomposes on melting.—Pharm. Journ., July 27, 1895, 75; from Gazz. Chim. Ital., through L'Union Pharm., xxxvi., 295.

*Cholesterins*.—*Distinction of those from Cryptogams and that of Animal Origin*.—E. Girard has formerly shown that the cholesterins extracted from certain cryptogams closely resemble the ergosterin of Tanret. He now shows that those occurring in beer yeast, in *Mucor mucedo*, and in *Lobaria pulmonacea* are similar in their nature, giving all the reactions of ergosterin. They differ from animal cholesterin in giving a red coloration with sulphuric acid and a green precipitate when water is subsequently added, the coloration in the case of animal cholesterin being yellowish and the precipitate white. Ergosterin and its allies, when dissolved in carbon tetrachloride, are also colored blood-red on being treated with sulphuric acid, *s. g.*, 1.76, the tetrachloride separating with a green color. Under similar conditions, the solution of animal cholesterin is colored yellow, or, in the presence of water, milk-white, and the tetrachloride separates uncolored.—Pharm. Jour., Dec. 28, 1895, 533; from Compt. rend., cxxi, 723.

*Spermaceti*.—*Specific Gravity and Melting Point*.—About two years ago, Lyman F. Kebler had occasion to examine several samples of spermaceti, and was much surprised to find that his data of specific gravities and melting points did not correspond with the U. S. P., which requires it to possess a specific gravity of "about 0.943, and a fusing point near 50° C." He now records the specific gravities, melting points, acid number and ether number, determined by him in seventeen samples of spermaceti, as follows:

Number.	Melting Point Degrees C.	Specific Gravity at 15° C.	Acid Number.	Ether Number.
1 .....	44.5	0.935	5.17	134.6
2 .....	43.5	0.935	2.33	125.8
3 .....	44.5	0.939	1.18	128.9
4 .....	44.5	0.939	1.13	126.2
5 .....	44.0	0.942	....	127.6
6 .....	44.0	0.933	....	126.9
7 .....	45.0	0.920	1.40	126.0
8 .....	46.0	0.933	....	127.4
9 .....	45.0	0.925	....	....
10 .....	47.0	0.925	0.90	127.8
11 .....	45.0	0.915	0.70	129.0
12 .....	45.0	0.920	1.43	132.0
13 .....	46.0	0.925	1.05	128.0
14 .....	47.0	0.930	1.43	131.0
15 .....	45.0	0.905	1.90	128.3
16 .....	43.0	0.925	....	131.6
17 .....	46.0	0.930	0.70	129.0

Nos. 4 to 17, inclusive, were samples taken from 90 cases, representing about 4,700 pounds of spermaceti, all obtained directly from New Bedford, Mass., No. 5 having been recrystallized twice from absolute alcohol; while No. 1 was obtained from Prof. Trimble, No. 2 from Prof. Stevens (University of Michigan), and No. 3 from Mr. England. The author

communicates the methods followed by him to ascertain the melting points and specific gravities of the samples examined, and reviews in some detail the results heretofore recorded by different experimenters, from which it appears that the melting point of spermaceti varies from  $41.6^{\circ}$  to  $47.7^{\circ}$  C., and the specific gravity approximates 0.943. The extremely high specific gravity, 0.96, and the high fusing points,  $49^{\circ}$  and  $50^{\circ}$  C., observed by several, probably represent *cetine*, which was obtained originally by Chevreul (1814) by repeatedly recrystallizing spermaceti from hot alcohol, and again examined by Stenhouse (1842) and by Heintz (1851 and 1852), the latter obtaining by repeated recrystallizations a cetine that melted as high as  $55.5^{\circ}$  C.

The author considers the acid and ether numbers the most reliable constants for spermaceti. He concludes from the data presented by him, that: (1) the melting point of spermaceti varies from  $42^{\circ}$  to  $47^{\circ}$  C., while that of cetine varies from  $48.9^{\circ}$  to  $55.5^{\circ}$  C.; (2) the specific gravity ranges from 0.905 to 0.945, at  $15^{\circ}$  C., and does not approximate 0.943 so rigidly as formerly reported; (3) the saponification number ranges from 125.8 to 134.6, while the acid number varies with the age of the sample; and (4), that the requirements of the Pharmacopœia are those for cetine, and not spermaceti.—*Amer. Jour. Pharm.*, Jan., 1896, 7-10.

*Cerotic Acid*—*A Mixture of two Distinct Acids*.—T. Marie, in a lengthy paper, gives an account of a research, the results of which lead him to the conclusion that the body known as "cerotic acid" is a mixture of two distinct acids. One of these appears to be identical with the

*Melissic Acid* obtained on oxidizing myricic and melissic alcohols, and is present to the extent of 40 per cent. The analytical data obtained from the analysis of the acid, its ethers, salts, and other derivatives, indicates that its formula is  $C_{30}H_{50}O_2$ . For the other acid, being present in the larger proportion, the author proposes to retain the name

*Cerotic Acid*. Its composition, as indicated by analytical results obtained under like conditions as those for the formula of melissic acid, is given as  $C_{25}H_{50}O_2$ . Details are given concerning a number of derivatives of both acids.—*Pharm. Journ.*, Feb. 29, 1896, 162; from *Annal. de Chim.*, etc. (7), vii., 145.

#### CARBOHYDRATES.

*Cereal Celluloses*—*Constitution*.—C. F. Cross, E. J. Bevan and Claud Smith, who have in previous communications dealt with the general bearings of the subject, now show in continuation of their experiments that the cereal cellulose may be resolved by acids into soluble derivatives of their furfuroid constituents, and a process has been devised which sharply effects this separation. Two methods of hydrolysis have been studied: one by treatment with acids of the series  $H_2SO_4 \cdot 2H_2O$ — $H_2SO_4 \cdot 3H_2O$  in the cold, dilution and filtration from reprecipitated cellulose, the furfuroid remaining in solution; the other, by treatment with dilute sulphuric acid,

1 to 2 per cent. strength, at 1 to 9 atmos. steam pressure, the best results being obtained on 15 minutes heating at 3 atmos. The furfuroid is obtained quantitatively, and, from a study of its composition, cupric reduction, certain special oxidations, etc., is concluded to be a pentose monoformal. Such a compound, having the empirical formula of a normal cellulose, could arise within a cellulose complex by an oxidation by internal re-arrangement.—Chem. News, May 15, 1896, 228.

*Reserve Cellulose—Characters and Distribution in the Seeds of Liliaceæ, etc.*—Prof. H. H. Rusby calls attention to a valuable paper by Miss Grace E. Cooley, which has been published as a doctoral thesis, and treats of "reserve cellulose," a peculiar substance not yet determined, but perhaps the same as Schulze's "hemicellulose." It was found as a secondary product laid upon the walls of the cells of the endosperm of ripe seeds of all the 22 genera of the *Liliaceæ* examined, representing 13 of the 32 families of that order, and also in 2 genera of the nearly related *Amaryllidaceæ* and 4 of the *Iridaceæ*. The associated cell-contents consist of oil and protein, but no starch except in the genera *Paris* and *Trillium*. Reserve cellulose swells and dissolves with hot, weak sulphuric and hydrochloric acids, but not with acetic acid; is but slightly affected by alkalis, and absorbs iodine freely with a brown color, the addition of sulphuric acid producing with the latter a violet-blue. Some exceptions to these rules are however noted.—Drugg. Circ., Jan. 1896, 6.

*Lignocelluloses—A New Type.*—W. C. Hancock and O. W. Dahl have subjected the pith-like stem of *Æschynomene aspera* to exhaustive chemical investigation in order to determine the nature of its wood substance, and find that its reactions show important exceptions from those characteristic of the lignocelluloses. The plant is of aquatic habit, the wood being modified to serve as a float, and the stems find extensive use in the manufacture of pith helmets. While it is often declared to be a *pith*, its morphological characters are those of a true wood. This is furthermore confirmed by the chemical investigation recorded by the author, which completely identifies this peculiar product of growth as a lignocellulose, an identification which has special significance to botanists as presenting a type of lignification of unique characteristics. The most important points established and confirmed are:

1. The existence of a lignocellulose having the essential constitutional features of the group, but devoid of free aldehyde groups and characterized by color reactions which are only in part those of the lignocelluloses generally; in others showing a close resemblance to the celluloses.
2. Certain color reactions, frequently regarded as essentially characteristic of the lignocelluloses proper, are in effect due to by-products.
3. Owing to the unusual conditions of growth, and metabolism obtaining in a tissue, specialized to serve an exceptional function, these by-product



ducts are not formed in a large proportion of the cells, which are nevertheless shown to consist of true lignocellulose.

4. That the true lignocelluloses contain furfurol-yielding constituents—furfuroids—which are not pentosans.—Chem. News, July, 1895, 16–18.

*Cellulose—Fermentation.*—V. Omelianski states that on adding Swedish paper, chalk, and a trace of Neva mud to a solution containing potassium phosphate, and magnesium and ammonium sulphates, a lively fermentation occurred when the mixture was exposed to air at a temperature of 30° to 35°. The paper became yellow, transparent, then gelatinous, and finally disappeared, the chalk being also dissolved. By utilizing Winogradsky's elective culture method, the author obtained the bacillus, supposed to be the cause of this decomposition of cellulose, in a pure state. He is of the opinion that *Bacillus amylobacter*, which is generally regarded as the special cause of the fermentation of cellulose, is not a separate species, but includes a number of forms which act as butyric ferments, but none of them possess in any marked degree the property of decomposing pure cellulose. The author gives a description of the new bacillus, and proposes to deal with the phenomena it provokes in a future communication.—Pharm. Journ., Nov. 30, 1895, 454; from Compt. rend., cxxi., 653.

*Cellulose—Quantitative Determination.*—G. Lange recommends a simplified method for the quantitative determination of cellulose, which is based upon the observations of Hoppe-Seyler that cellulose is not affected by melting it with the strongest alkali at 200°. The substance is heated in a high porcelain crucible in an oil bath with three times its weight of potassium hydrate—free from nitrate—and two to four times its weight of water, at a temperature of 175° to 180°, this temperature being carefully observed and controlled. After the reaction, which is accompanied by frothing, the heat is continued for about an hour, the crucible removed from the oil bath, and the melt, when cooled to 75° or 80°, is dissolved in water, amounting to 8 to 15 times the weight of the original substance. By the aid of the centrifuge it is washed, first under acidulation with sulphuric acid, then with alkaline fluid, and finally, successively with hot water, alcohol, and ether, after which it is dried, weighed, and incinerated.—Pharm. Centralh., January 9, 1896, 18; from Zeitsch. f. angew. Chem., 1895, 561.

*Starch Grains—Composition and Transformation.*—A. Meyer considers that starch grains are true sphere crystals in every way analogous to those of inulin. They contain two forms of amylose and amyloextrin. The action of diastase on starch he regards as a purely catalytic process, under which the amylose takes up water and splits into two molecules of amyloextrin. The latter is transformed into isomaltose and dextrin, both of which pass into maltose.—Pharm. Journ., Nov. 2, 1895, 366; from Bot. Gazette., xx., 458.

*Mucilages—Varieties in Plants.*—Mangin proposes to distinguish the

mucilages of plants by considering them under two categories, simple and mixed mucilages. The

*Simple mucilages* are in their turn classed under three heads, viz., cellulose mucilages, pectose mucilages, and callose mucilages.

*Cellulose mucilages* are very rare, being nearly confined to the salep derived from the roots of orchideæ.

*Pectose mucilages* include those of the Malvaceæ, Tiliaceæ, Rosaceæ, Abietineæ, and the mucilaginous sheath of certain Algæ.

*Callose mucilages* occur in sieve tubes, the membrane of the sporangium of the Mucarini, etc. Among

*Mixed mucilages* the only combination known to the author is that of cellulose and pectose mucilages in varying proportions. These occur especially in seeds and pollen-grains, and are formed at the expense of cell-walls in contact with the air.

Intermediate mucilages, which cannot be included under either of the above categories, also occur, such as that of the endosperm of the seed of the carrot.—Pharm. Jour., Aug. 3, 1895, 110; from Bull. Soc. Bot. de France, xli., 40-49.

*Mucilages—Composition in Various Plants.*—K. Yoshimura has examined the mucilages in a number of plants. He precipitated the concentrated slimy extracts with strong alcohol, washing the precipitate with alcohol, boiled them with sulphuric acid of 2-4 per cent. for two to five hours, neutralized the liquid with barium carbonate, and then evaporated the filtrate to syrup. The syrup so obtained was examined for mucic acid with nitric acid; for mannose with cold concentrated solution of acetate of phenylhydrazine (formation of mannose-phenylhydrazine); for pentoses with phloroglucin and hydrochloric acid; and for osazones in the usual manner. He thus found the mucilage of

*Sterculia platanifolia* to consist of mixtures of araban with some galactan; that of

*Colocaria antiquorum* to consist probably only of a polyanhydride of *d*-glucose; that of

*Vitis pentaphylla*, as also that of

*Opuntia*, to consist principally of galactan; while the mucilages of

*Oenothera Jaquinii*, and of

*Kadsura japonica* contain galactan and araban.—Amer. Jour. Pharm., Feb. 1896, 111-112; from Bull. Imper. Coll. Agriculture, Tokio, Japan, ii, No. 4.

*Mucilages—Distribution in Plants of the Malvaceæ.*—J. A. Guiraud has investigated the distribution of the mucilages in the official *malvaceæ*. He states that the receptacles are not of lysigenous origin, as has been usually stated. The mucilage is formed in all the organs, and results

from the gelatinization of the walls of special cells found only in the secondary parenchyma. It may remain in enclosed cells, or may flow out into passages or receptacles formed by a dissociation of the tissues. In the root the formation of the mucilage coincides with that of the secondary structures. In the stem of *Malva* the mucilage cells appear first in the pith, then in the cortical parenchyma and the hypodermal parenchyma; it is most abundant in the periphery of the stem, where it arises partly in the cells, partly in the intercellular spaces. In the leaf its formation follows a similar course to that in the stem, occurring both in the cells and in special receptacles; it abounds especially in the leaf of *Malva sylvestris*. Mucilage is very abundant in the flowers of *Malva* and *Althaea*, but its distribution is very variable; in *M. sylvestris* it occurs in large quantities in the epiderm of the calyx and epicalyx, and in the fundamental parenchyma of the petals.—Pharm. Jour., Feb. 1, 1896, 87; from Bot. Centralh., 1895, 376.

*Mucilage—Reagent for its Determination in Plant Cells.*—Guiraud employs a saturated solution of almost colorless haematoxylin in absolute alcohol, mixed with 100 times its volume of hot saturated solution of ammonia alum as a reagent for the detection of mucilage in plant cells. The rose-colored liquid deposits alum and becomes violet; it is then filtered and mixed with 30 per cent. of glycerin by measure. This reagent has the advantage of staining only the contents of mucilage cells, and not their walls.—Pharm. Journ., Nov. 2, 1895, 366; from Repert. de Pharm. 1895, 71.

*Gum of Wines—Difference from Gum-Arabic.*—G. Nivière and A. Hubert, in opposition to Pasteur and Bechamp, show that there exists a marked difference between the gum of wines and gum-arabic. The latter, when oxidized with nitric acid, only yields 35 per cent. of mucic acid, while the gum of wine yields 70 to 75 per cent. If the gum of wine is boiled with dilute sulphuric acid it yields no arabinose, but is converted into galactose, whilst reducing agents change it into dulcitol. Gum-arabic, if heated with dilute sulphuric acid, yields arabinose, and with reducing agents it forms arabitol.—Chem. News, Sept. 27, 1895, 161; from Compt. rend., Aug. 19, 1895.

*Pectin Substances—Constitution.*—It has heretofore been announced that the pectin compounds are near relatives of the carbohydrates, from which they are distinguished by a higher atomic proportion than the normal 1 : 2 of oxygen and hydrogen. The recent investigation of Tollens upon a series of typical pectin substances have, however, shown that the atomic proportions of oxygen to hydrogen in these bodies are approximately 1 : 2, and that they pass by inappreciable gradations, in their composition as well as in their properties, into the group of plant mucilages. They must therefore be regarded as oxy-plant-mucilages.—Pharm. Centralh., March 5, 1896, 132; from Chem. Ztg., 1895, 782.

*Sugars—Action of Alkalies.*—Leboy de Bruyn and van Ehenstein have found that very minute proportions of alkalies affect the rotation of several sugars very materially. As a general result of a large number of experiments, it has been ascertained that this change is due to a reciprocal transformation of the different sugars into each other. This has been established in the case of glucose, fructose and mannose, each of these sugars being changed under the influence of hydroxyl ions, alkalies, etc., into the other two.—Pharm. Journ., Feb. 1, 1896, 81: from *Berichte*, xxviii., 3078.

*Sugars—Action on Ammoniacal Silver Nitrate*—James Henderson, while pursuing a research in which it was essential that very small quantities of sugars produced in the course of experiment should be estimated quickly and accurately, was led to undertake the comprehensive research recorded by him in his present paper with the view to discovering a method whereby such an estimation could be satisfactorily accomplished, because the adoption of the various copper methods was precluded. The principle of the method adopted for this purpose, like Fehling's, is based upon the fact that alkaline solutions of certain metals undergo reduction when heated with certain oxidizable compounds, such as sugars, and selecting ammoniacal silver nitrate as possibly well adapted, he has made an extensive series of experiments, the results of which are summarized as follows: (1) When dextrose, levulose and galactose are heated with ammoniacal silver nitrate under certain given conditions, a definite factor can be obtained in each case. (2) Cane sugar, starch and dextrin, when heated under the same conditions, exert no reducing action on ammoniacal silver nitrate. (3) In case of lactose and maltose a definite factor cannot be got, owing to the gradual hydrolysis of the disaccharide molecules of the ammonia.—Journ. Chem. Soc., March, 1896, 145-154.

*Sugars—Modification of Soldaini's Reagent.*—H. Ost proposes the following modified formula for Soldaini's reagent for the quantitative determination of the sugars: 17.5 Gm. crystallized copper sulphate are slowly added to a solution of 250.0 Gm. potassium carbonate and 100.0 Gm. potassium bicarbonate in enough water to make the final product measure 1 liter. The addition must be gradual, so that carbonic acid may not be eliminated in large quantities. In case the solution is not perfectly clear, it is filtered through asbestos or paper, the first portion of filtrate being rejected. The new reagent is employed as follows: 100 Cc. of the reagent are mixed with 50 Cc. of the diluted sugar solution, rapidly heated in an Erlenmeyer flask on wire netting to boiling, boiled 10 minutes, cooled rapidly, and filtered by the aid of a Sprengel-pump through an asbestos tube, in which the precipitate is washed, first with potassium carbonate solution (if the filtrate passes blue), then with hot water, and finally with alcohol. It is then dried, heated to redness, and reduced in a current of hydrogen. The relations of the various sugars to the copper are given by numerous deter-

minations made by the author, only one series of which, however, may find place here, viz.: Copper, 100; dextrose, 30.7; levulose, 29.0; invert sugar, 30; maltose, 57.9.—Chem. Ztg., 1895, 1784.

*Cane Sugar—Characteristic Reaction with Cobalt Nitrate.*—According to the observation of Papasogli, an aqueous solution of cane sugar, when treated with a few drops of a 5 per cent. cobalt nitrate solution and then with an excess of 50 per cent. soda solution, yields a handsome and permanent violet coloration. Glucose, under the same conditions, yields a transient blue color, which soon gives place to a dirty greenish coloration. Lactose also gives a transient blue. The reaction is applicable to the detection of caramel in alcohol, or of saccharose in ten times its quantity of glucose, but is modified by gum or dextrin, which must, therefore, first be removed by means of lead subacetate or barium hydrate.—Pharm. Centralh., Oct. 3, 1895, 571; from Rép. de Pharm., 1895.

*Beet Root Sugar—Possible Presence of Lead.*—Dr. Altschul calls attention to the possible presence of lead in beet root sugar, in view of the fact that this is now being manufactured under a patent based upon the recovery of the total crystallizable sugar in the molasses by conversion into a crystalline lead compound. The easily separable lead saccharate is eventually decomposed with carbonic acid.—Pharm. Centralh., Dec. 12, 1895, 707-709.

*Milk Sugar—Detection of the Presence of Cane Sugar.*—Conrady's test for the detection of cane sugar in milk sugar is as follows: One Gm. of milk sugar is dissolved in 10 Cc. of water, 10 Gm. of resorcin is added, then 1 Cc. of hydrochloric acid, and the mixture is boiled for five minutes. The liquid turns red if the sugar of milk contains cane sugar.—Chem. and Drugg., Jan. 4, 1896, 14.

*Chloraloses—Further Studies of the Compounds of Chloral with Sugar.*—In continuation of his studies of the compounds of various sugars with chloral, to which he has applied the general name "chloraloses" (see Proceedings 1895, 676), Hanriot states that galactose combines readily with chloral when the mixture is warmed for an hour at 100° C. in the presence of hydrochloric acid. On purification by heating with water and subsequent cooling,

$\beta$ -Galactochloral,  $C_8H_{11}Cl_2O_6$ , separates in crystals melting at 202°. The mother liquor retains a certain amount of the compound, together with a crystalline compound recognized as

$\alpha$ -Galactochloral, but the latter could not be isolated in a state of purity. The  $\beta$  galactochloral is almost completely insoluble in water and in ether, but soluble in methylic alcohol. When its potassic solution is treated with benzoyl chloride.

*Tribenzoylgalactochloral*,  $C_{28}H_{25}Cl_2O_6(C_7H_5O)_3$ , is formed, crystallizing in long needles, which melt at 141° and are soluble in alcohol, methylic alcohol, or benzin, but only slightly soluble in ether.

*Levulochloral*,  $C_6H_{11}ClO_6$ , was obtained in crystals melting at  $228^\circ$ . It is soluble in cold water, more so in boiling water and in alcohol, but only slightly soluble in ether.

Bromal was found to give similar compounds with the sugars, but the

*Bromaloses* are less soluble and less easily obtained than the chloraloses. With arabinose, however, bromal yielded small crystals of

*Arabibromal*,  $C_7H_9Br_2O_6$ , which is slightly soluble in water, but otherwise insoluble, melts at  $210^\circ$ , and is decomposed on prolonged boiling of the solution.—Pharm. Journ., June 27, 1896, 501; from Compt. rend., cxxii., 1127.

*Dichloralglucose—Distinction from Monochloral glucosane*.—J. Meunier describes dichloralglucose as occurring in white needles, insoluble in water, soluble in 300 p. alcohol and in 45 p. of ether at  $20^\circ$ . It fuses at  $225^\circ$ , and resists the action of acids.

*Monochloral glucosane* forms nacreous lamellæ, fusible at  $225^\circ$ , insoluble in water and cold alcohol, soluble in boiling alcohol but re-deposited on cooling and soluble in 1000 p. ether. It is not attacked by acids.—Chem. News, Feb. 14, 1896, 83; from Compt. rend., Jan. 20, 1896.

*Mannose and Mannane*.—Occurrence in the seeds of *Diospyros Kaki*, L., which see under "Materia Medica."

*Volemite—Characters and Conversion into Volemose*.—The attention of Emil Fischer having recently been directed to the mannit-like compound extracted some years ago by E. Bourguelot from *Lactarius volemus*, Fr., and named by him "volemite," he has converted it into the corresponding sugar, "volemose," which he was able to isolate in the form of osazone. Bourguelot described volemite as occurring in fine needles, having a sweet taste, very soluble in water, slightly soluble in cold alcohol, and melting at  $140^\circ$ – $142^\circ$ . Fischer finds the melting point to be  $141^\circ$ , and analysis proves it to be a heptite, having the composition  $C_7H_{14}O_7$ .—Pharm. Journ., Nov. 30, 1895, 453; from Journ. de Pharm. (6), ii., 385–390.

*Sorbinose—Production by Bacterial Action from Sorbite*.—The contradictory results obtained by other chemists since the discovery of sorbinose in the berries of species of *Pyrus* (*Sorbus*) by Pelouze, in 1852, has induced G. Bertrand to investigate the subject with great care. His investigations prove conclusively that the sugar does not originally exist in the juice from the berries of *Pyrus* (*sorbus*) *aucuparia*, *P. intermedia*, or *P. latifolia*, and when the juice was allowed to ferment, all the glucose present disappeared and a corresponding amount of alcohol was formed, but no trace of sorbinose appeared. He found, however, that after acetic fermentation had set in, some reddish flies (*Drosophila funebris*, Fabricius, *D. cellaris*, Macquart) deposited their eggs upon the surface of the liquid, near the edge, and a gelatinous pellicle was formed, which, on examination, was found to consist of microbes apparently identical with *Bacterium*

*xylinum*, Brown; while the liquid was now found to contain sorbinose, having apparently been produced from the sorbite in the juice by the action of the bacteria in the presence of oxygen. Once in possession of the special ferment, it is possible to cultivate it either upon the fermented juice of fruits, or upon an artificial medium, such as a 1 per cent. peptone solution containing salts and some sorbite.—Pharm. Journ., May 30, 1896, 421; from Compt. rend. cxxii., 900.

#### ORGANIC ACIDS.

*Vegetable Acids—New Method of Separation and Identification.*—When studying the compounds of some of the vegetable acids with quinine and cinchonine, L. Lindot found that the resulting salts, and especially the acid salts, present differences of solubility in methylic alcohol, such that it is easy to distinguish citric and malic acids and to separate them from vegetable juices. This observation is important, since it is difficult to distinguish between these two acids so frequently present in vegetable tissues, and as the result of his investigation the author has devised the following method for their isolation and identification: The tartaric acid and tartrates having been eliminated by well-known methods, the extraction of the acids is evaporated in a vacuum, and the residue of evaporation is dissolved in methylic alcohol as concentrated as possible. A known volume of this liquid is diluted with methylic alcohol, so that the solution may contain 2.5 per cent. of acid, and quinine (alkaloid) is then added until after being stirred for some time it sets into a crystalline mass. The quantity of quinine should not exceed 160 to 170 parts to 100 parts of citric acid supposed to be present, because an excess of quinine would dissolve—momentarily at least—the acid citrate, and form the more soluble neutral citrate. The proportion of the quinine necessary having thus been ascertained, the remainder of the methylic alcohol solution of the acids is treated in the same way by the calculated quantity of powdered quinine, and after settling for twenty-four hours filtered. The precipitate thus obtained is quinine citrate, to which must be added 0.3 per cent. of the weight of methylic alcohol employed, that being the extent of its solvent action upon the compound. If then the mother-liquor is treated with powdered cinchonine in the same way, using not more than 140 to 150 per cent. of estimated malic acid present, a precipitate of cinchonine malate is produced which is not interfered with by the presence of quinine (as malate—Rep.), and is formed under conditions precisely similar to those under which the quinine citrate is produced in the previous operation. It is easy to secure the corresponding acids from the salts of quinine and cinchonine so obtained. It is sufficient to add to the aqueous solution some ammonia, to filter off the alkaloids separated, to precipitate the filtrates with lead acetate, and to decompose the lead compounds with hydrogen sulphide.—Chem. News, June 26, 1896, 295–296; from Compt. rend., cxxii, 1185.

*Oxalic Acid*.—Use for preserving the color of *herbarium specimens*, which see under “Materia Medica.”

*Calcium Oxalate*.—Characteristic occurrence in the pericarp of *Umbellifera*, which see under “Materia Medica.”

*Formic Acid*.—*Determination by Chromic Acid in Presence of Acetic Acid*.—Freyer recommends the determination of formic acid by the following method: 10 to 20 Cc. of the liquid, containing not more than 0.5 Gm. formic acid, are boiled under a reverse condenser for  $\frac{1}{2}$  to 1 hour with 50 Cc. of a 6 per cent. potassium dichromate solution and 10 Cc. of conc. sulphuric acid. The cooled liquid being brought to 200 Cc., the unconsumed chromic acid is titrated as follows: 10 Cc. are mixed with 1 to 2 Gm. of potassium iodide, free from iodate, 10 Cc. of 25 per cent. phosphoric acid, and a little water. The mixture is allowed to react during 5 minutes, is then diluted to 100 Cc. with water, and the liberated iodine titrated with  $\frac{1}{10}$  N. thiosulphate solution in the usual manner. Acetic acid does not interfere.—Chem. Ztg., 1895, No. 51.

*Aluminum Succinate*.—*Natural Occurrence in Plants*.—J. H. Maiden and H. G. Smith have examined a natural deposit found in the wood of *Grevillea robusta*, R. Br., and proved that it consists of aluminum succinate. It is stated, in their report to the Royal Society of N. S. Wales, that the substance is quite soft, almost white, and partly crystalline, minute acicular crystals being seen between crossed Nicol prisms, with a quarter-inch objective. The composition is given as succinic acid 43.464, alumina 31.447, water 31.447 per cent., and it is regarded as a basic aluminum succinate,  $\text{Al}_2(\text{C}_4\text{H}_4\text{O}_4)_3 \cdot \text{Al}_2\text{O}_3$ .—Pharm. Journ., May 2, 1896, 344.

*Vinegar*.—*Quality of Specimens from English Dealers*.—R. C. Cowley has examined twelve samples of vinegar, some from pharmacists and some from other dealers, and finds them all to come below the B. P. standard, but only one could be regarded as a “doctored acetic acid.” Besides applying the official tests, the author determined the amount of extractive matter yielded by evaporating the sample to dryness on a water bath. The results are given in a table as follows:



Sample.	Acid per cent.	Extractive per cent.	Specific Gravity.	Sulphates.
A	4.78	2.13	1.015	Faint trace.
B	5.09	2.47	1.016	Not exceeding B. P. limit.
C	4.08	2.69	1.017	Traces.
D	5.19	3.17	1.019	Not exceeding B. P. limit.
E	2.47	1.77	1.011	Traces.
F	2.29	.46	1.005	Nil.
G	4.009	2.26	1.014	Traces.
H	4.87	2.10	1.016	Traces.
I	4.13	2.86	1.017	Traces.
K	4.26	1.71	1.013	Not exceeding B. P. limit.
L	4.206	2.55	1.015	Traces.
M	4.25	1.36	1.011	Traces.

—Pharm. Journ., Jan. 4, 1896, 16.

*Lead Acetate—Contamination with Prussian Blue.*—Dr. Schneider had occasion to test some "pure" lead acetate which had a suspicious bluish tint. He at first attributed this tint to the presence of copper, but finally determined it to be due to Prussian blue. He suggests as an explanation of the coloration, that potassium ferrocyanide is employed to throw out iron in the course of the purification of the salt; that a small quantity of ferrocyanide is left in the salt, and is eventually converted into Prussian blue by prolonged exposure. Incidentally the author determined the relative sensitiveness of the test for copper in the presence of *lead acetate*, which, see under "Organic Acids."

*Thio-acetic Acid—Preparation and Uses for Arsenic Determinations.*—R. Schiff obtains thio-acetic acid by the action of glacial acetic acid upon phosphorus pentasulphide, which must be mixed with about one-half its weight of broken glass to prevent inconvenient frothing. The operation is best conducted in a flask (the author uses Italian wine flasks), because of the difficulty to clean retorts after the operation is ended. A two-liter flask is used for 300 Gm. glacial acetic acid, 300 Gm. phosphorus pentasulphide, and 150 Gm. broken glass, the mixture being distilled at 103°. The distillate is rectified at 92° to 97°, and amounts in its rectified condition to about one-third of the acetic acid used.

Thio-acetic acid is employed in the toxicological analysis for arsenic, either in the free state in form of six per cent. solution, or as ammonium salt in thirty per cent. solution. In practice the liquid containing arsenic is treated in the usual manner until it is ready for treatment with hydrosulphuric acid, instead of which 2 to 3 Cc. of thio-acetic acid solution are added, and the liquid is boiled. The arsenic is thus completely precipitated in a short time.—Pharm. Centralh., July 25, 1895, 425; from Ber. Chem. Ges., 1895, 1204.

*Thio-Acetic Acid—Commercial Characters.*—E. Merck describes thio-

acetic acid,  $\text{CH}_3\text{C}:\text{O}(\text{SH})$ , as a yellowish fluid, becoming yellow by age, soluble in water and in alcohol, and having the odor peculiar to organic sulphur compounds. The theoretical boiling point of the pure acid is  $93^\circ\text{C}$ .; that of the commercial acid is  $90^\circ$  to  $100^\circ\text{C}$ .

*Ammonium Thio-acetate* is supplied in solution, and so constitutes Schiff's reagent as a substitute for hydrogen sulphide in quantitative and qualitative analysis. The liquid contains about 30 per cent. of the ammonium salt, and has faintly the odor of ammonium sulphide.—Pharm. Centralh., Febr. 13, 1896, 92.

*Benzoic Acid—Preparation from Benzal chloride, etc., by Heat, Without Pressure.*—P. Schulze has succeeded in producing benzoic acid (or benzaldehyde) by heating benzalchloride or benzotrichloride without resorting to pressure, the necessary conditions being the presence of certain contact substances, such as ferric benzoate or metallic iron in the form of powder or turnings. The reaction then takes place upon a water bath, instead of at a temperature of  $140^\circ$  to  $190^\circ$ . The process is patented.—Pharm. Centralh., April 9, 1896, 221.

*Benzoates—Method of Assay.*—G. Rebière has devised a method of determining the proportion of base and benzoic acid in benzoates generally, and particularly in benzoates of the alkalis. By dissolving a weighed quantity of a benzoate in water, adding hydrochloric acid and evaporating to dryness, the base alone will remain in the form of a chloride, and can be determined by volumetric solution of silver nitrate. The same quantity of the benzoate is then again dissolved in water, and the amount of sulphuric acid requisite to exactly combine with the base calculated from the previous operation is added to the solution. The benzoic acid, previously in combination, will be liberated, and can be determined by volumetric alkali and phenolphthalein. The results obtained are said to agree with the calculated quantities. In the case of ammonium benzoate a modification has to be made.—Pharm. Journ., Feb. 29, 1896, 162; from Journ. de Pharm., et de Chim. (6), iii., 113.

*Saccharin—Purification.*—W. J. Pope finds that saccharin—ortho-benzoic sulphinide—may be obtained pure and free from para-sulphamine-benzoic acid, with which it—the commercial product—is contaminated, by crystallization from acetone. Pure ortho-benzoic-sulphinide is deposited from cold acetone solution in colorless, transparent, monosymmetric crystals, two centimeters or more in length, which possess the remarkable property of brilliant phosphorescence on being crushed.—Pharm. Journ., Nov. 2, 1895, 366; from Jour. Chem. Soc. lxvii., 985.

*Saccharin—Comparison of its Solubility in Ether with that of Para-Sulphamine Benzoic Acid.*—Rudolf Hefelman observes that saccharin (= ortho-anhydrosulphamine benzoic acid) and para-sulphamine benzoic acid

are distinguished from each other, as in their melting points and in their behavior, to 70–73 per cent. sulphuric acid, so also in their solubility in ether. In experiments recorded 100 Cc. of ordinary ether dissolved 0.835 Gm. of ortho-anhydrosulfamine benzoic acid, while the same quantity of ether dissolved only 0.0195 Gm. of para-sulfamine benzoic acid, thus showing the solubility of saccharin to be 43 times greater than that of the para-sulfamine benzoic acid. This is a difference in solubility so great that an admixture of the latter with saccharin can be readily determined, the greater part of the para-acid remaining undissolved in the ether, and its identity may then be established by its higher melting point, which is  $286.5^{\circ}\text{C}$ ., whereas that of saccharin is only  $224.5^{\circ}\text{C}$ .—Pharm. Centralh., May 9, 1896, 279–280.

*Magnesium Salicylate—Preparation of a Pure Salt.*—When magnesium salicylate is prepared by neutralizing salicylic acid with magnesium carbonate, the resulting salt has, according to R. van Goot, a more or less pronounced pink tint, due to the presence of iron in the magnesium carbonate. To obtain a salt absolutely free from iron, the author recommends the following circumstantial process: Sulphuric acid is neutralized with calcined magnesia, hydrochloric acid is added to the solution of magnesium sulphates, and then an excess of potassium sulphocyanate. The solution is then repeatedly shaken with ether, so long as fresh portions of the latter become colored by the ferric sulphocyanate that has been produced. The aqueous solution is then evaporated to crystallization, and the crystals of magnesium sulphate are washed with alcohol to remove hydrochloric acid and sulphocyanate, until a reaction of the latter is no longer obtained with ferric chloride. The pure salt so obtained is dissolved in distilled water, and solution of sodium carbonate added gradually, under constant shaking and maintenance of a temperature of  $70^{\circ}\text{C}$ ., until precipitation is complete. The precipitate, washed until completely free from sodium carbonate, is suspended in water, neutralized with salicylic acid at the temperature of a water-bath, and evaporated to dryness at the same temperature.—Pharm. Journ., Aug. 31, 1895, 178; from Jour. de Pharm. d' Anvers, li., 282.

*Strontium Salicylate—Preparation.*—Fred A. Sieker gives a method for the preparation of strontium salicylate as follows: Having determined the purity of the strontium carbonate, and particularly the absence of barium carbonate (by the addition of a few drops of potassium dichromate T. S. to a solution of 1 Gm. of the carbonate in sufficient acetic or hydrochloric acid and water to make 10 Cc., whereby no turbidity shall be produced), 276 p. salicylic acid are mixed with 3500 p. distilled water and *almost* neutralized with the pure strontium carbonate, about 148 p. of this being required, the reaction being conducted in a porcelain capsule at a temperature of about  $80^{\circ}\text{C}$ . The hot, slightly acid solution is rapidly filtered, evaporated to about half its volume, and set aside to crystallize. A second

crop of crystals may be obtained by further concentration of the mother liquid. The crystals are washed with cold distilled water and dried at the ordinary temperature, or at a temperature not exceeding 50° C. The crystals are of a slightly pinkish shade, but produce a pure white powder, have a slight acid reaction to sensitive litmus, but become neutral on recrystallization. Strontium salicylate requires about 18 parts of water at 20° C. for solution, is very much more soluble in boiling water, and forms a colorless, or at most faintly pinkish solution. It is sparingly soluble in cold alcohol.—Notes on New Rem., June, 1856, 50–51.

*Alumino-potassium Salicylate*, an antiseptic made by mixing solutions of potassium acetate and aluminum salicylate in synthetic proportions.

*Sodium Boro-Salicylate—Formula for Preparation.*—The following formula for preparing sodium boro-salicylate is given in "Monit. de Pharm" (1895, 1951): 700 p. of water, 125 p. of boric acid, and 320 p. of sodium salicylate are heated in a flask provided with a condenser until a syrupy liquid is produced. This solidifies on cooling, and, when dried on shallow plates, yields a white product. Sodium borosalicylate is a powerful antiseptic. It dissolves in water, forming a 20 per cent. solution at 40° C. It is easily soluble also in methyl alcohol, ethyl alcohol, amyl alcohol, acetic ether, glycerin, and acetone, but insoluble in ethyl-ether.—Pharm. Centralh., Feb. 27, 1896, 129.

*Salol—Detection of Free Salicylic Acid.*—Griggs is of the opinion that the impurities in salol are more frequently due to adulterations than to faulty methods of preparation. Free salicylic acid, which is of frequent occurrence, is readily detected by its reaction with iron salts (the intense violet coloration) which is not produced by salol. He dissolves for this purpose 0.1 Gm. of the suspected salol in 5 Cc. of ether and adds some 10 per cent. *ferrous* sulphate solution. In presence of even traces of salicylic acid, the liquid at the point of contact shows a characteristic violet ring after a short time, but this is not formed if the salol is pure.

*Betol, Kresalol, Salacetol and Salophen* may be tested in the same way, since these also, when pure, do not afford a reaction with the iron salt.—Pharm. Centralh., October 17, 1895, 595; from Bollet. chimico-pharm., 1895, 484.

*Salol—Estimation in Bandages, etc.*—Barthe recommends for the estimation of salol in bandages that 4 Gm. of the substance be heated for three hours under pressure with 100 Cc. of  $\frac{1}{10}$  N. potassium hydrate, a beer bottle with patent stopper answering well for this purpose. 25 Cc. of the liquid are mixed with 25 Cc. of  $\frac{1}{10}$  N. sulphuric acid, a suitable indicator is added, and the excess of acid is titrated with  $\frac{1}{10}$  normal potassium hydrate. The number of Cc. of the latter so consumed, multiplied by 2.14, gives the percentage of salol contained in the bandage.

*Kresalol* may be estimated in the same manner in bandages, the multi-

plier 2.14 being replaced by 2.28, however. The method is not suited to the examination of bandages containing resin.—Pharm. Centralh., July 25, 1895, 426; from Jour. de Pharm., 1895, 489.

*Citric Acid—New Reaction.*—Ludwig Stahre suggests a new reaction for the identification of citric acid, which is dependent upon the formation of acetone by the oxidation of citric acid, and the conversion of the acetone by means of bromine into a bromo-substitution compound, which is evidenced by its insolubility. If a solution of 2 Gm. of citric acid in 1 Cc. of water is heated with 0.1 Gm. of permanganate until the liquid loses its color, the addition of 3 to 5 drops of bromine water will produce a turbidity or precipitate either in the warm solution or after it has cooled: the precipitate being more soluble in warm than in cold water.—Pharm. Centralh., July 11, 1895, 401; from Nordsk. Farma. Tidsk., 1895, 141.

*Citric Acid—Formation by Oxidation of Cane Sugar.*—In the "Chemical News" (lxxi., 296) Dr. T. L. Phipson announced the formation of citric acid by the action of potassium permanganate, at 25° C., on cane sugar in aqueous solution containing free sulphuric acid. Alfred B. Searle and Arnold R. Tankard have now carefully followed the directions given by Dr. Phipson, and, like him, obtained no precipitate on adding calcium chloride to the cold neutralized solution, but on boiling a copious white precipitate was thrown down. This precipitate, however, was not calcium citrate, as had been found by Dr. Phipson, but consisted wholly of hydrated calcium sulphate. Analytical determination revealed that it contained sulphuric acid and calcium in the proportion required by the formula  $\text{CaSO}_4$ .—Chem. News, July 19, 1895, 31-32.

In a "second note," Dr. Phipson makes some further remarks respecting the production of citric acid from cane sugar by oxidation, in the course of which he suggests that the failure of the above-named chemists to obtain citric acid is probably due to the use of too much sulphuric acid, and because they did not separate the organic acid by alcohol as he did.—Ibid., Aug. 30, 1895, 100.

Edwin P. Hicks, following out the directions of Dr. Phipson as exactly as possible, but varying the conditions in order to note any difference in the course of the reaction with different relative amounts of acid and permanganate, as well as the concentration of the solution, obtained results which corroborate those of Searle and Tankard. The author, therefore, considers it futile to look for the formation of citric acid under the conditions mentioned in Dr. Phipson's original paper, unless other conditions than those specified are admitted.—Ibid., Oct. 4, 1895, 165-166.

In a "third note," Dr. Phipson calls attention to some possible sources of error in the experiments made by the chemists who have criticised his results, and communicates the following experiment made without sulphuric acid; Equal weights of sugar, nitric acid, and permanganate of potash are taken, and the mixed solution is left for twenty-four hours in the cold.

The clear solution is neutralized by calcium carbonate, which occasions a copious precipitate. The clear liquid from this precipitate, when boiled, yields a further smaller precipitate. The first contains tartaric acid, and perhaps saccharic acid, which has the same composition as citric acid. It is soluble without effervescence in acetic acid, and therefore contains no oxalic or carbonic acid. The second precipitate is citrate of calcium.—Chem. News, Oct. 18, 1895, 190-191.

Following Dr. Phipson's directions in his "third note," Messrs. Searle and Tankard failed to obtain citric acid, and they still maintain that it cannot be obtained in the manner described by Dr. Phipson originally or since.—Ibid., Nov. 15, 1895, 235.

*Lithium Citrate and Acetate—Diuretic Value and Preference Over Other Lithium Salts.*—Mendelsohn speaks favorably upon the value of lithium salts as diuretics, and gives preference to lithium citrate, both because of its stronger effect and because of its more agreeable taste than that of the other lithium salts. Next to the citrate the author prefers the acetate, which, while nearly as palatable, may readily be produced from the carbonate in form of a "saturation." In either form the remedy is well borne by patients, and the salts may be given in average doses of 0.1 Gm. 3 to 4 times daily.—Pharm. Centralh., Oct. 24, 1895, 617; from D. Med., Wochenschr., 1895, 673.

*Tartaric Acid—Modification of Mohler's Test.*—Denigès gives the following modification of Mohler's test for tartaric acid. A solution of 2 Gm. of resorcinol in 1 per cent. dilute sulphuric acid is added to 20 times its volume of strong sulphuric acid. In the presence of tartaric acid this liquid gives with a few drops of the fluid to be tested a characteristic violet red color when the mixture is heated to 115°-140°—Amer. Drugg., March 25, 1896, 182; from Journ. de Pharm.

*New Organic Acid—Formation from Tartaric Acid.*—Henry J. Horstman Fenton observes that when tartaric acid is oxidized under certain conditions in presence of a ferrous salt, a substance is produced which acts as a powerful reducing agent, and which gives a beautiful violet color with ferric salts in presence of alkali. This substance, which has been isolated with difficulty, proves to be a dibasic acid having the formula  $C_4H_4O_8 \cdot 2H_2O$ . For its production the presence of a *ferrous* salt is essential. If moist ferrous tartrate be exposed to the air for a short time a certain quantity of the new acid is produced, and may be indicated by the characteristic violet color given when caustic alkali is added. The constitution of the acid is now under investigation.—Chem. News, Oct. 4, 1895, 164.

*Cream of Tartar—Inadequacy of the B. P. Test.*—H. H. Robins points out that the official (B. P.) test for cream of tartar is inadequate, as it does not provide against sulphate of lime as an impurity. Moreover the

assay method is poor. One sample contained according to the official method 84 per cent. of potassium bitartrate, while direct titration showed it to contain 94.5 per cent., besides which it contained 0.8 per cent. of calcium tartrate and 3.6 per cent. of calcium sulphate. The latter occurs in the better grades of German cream of tartar, while it is the chief impurity in French calcium tartrate. If the official test is used at all, it should be used in conjunction with direct titration, while the ash should be ignited, heated with ammonium carbonate, gently ignited, and weighed as calcium carbonate. The difference between the direct and indirect determination of tartrate shows how much sulphate there is, and any calcium carbonate in excess of that required for  $\text{CaSO}_4$  should be calculated as tartrate.—Chem. and Drugg., April 25, 1896, 578.

*Cream of Tartar—Assay by Direct Titration.*—C. U. Hill states that he has found the process of direct titration with alkali to give trustworthy results in determining the amount of potassium hydrogen tartrate in cream of tartar, and that it is not alone far more expeditious and convenient than the ignition process recommended by the B. P., but far more accurate. The author gives several examples in support of his opinion and statements. For the assay, about 1 Gm. of the substance is weighed into a flask, and warmed with a slight excess of  $\frac{1}{2}$  N. soda. The excess of alkali is then titrated with  $\frac{1}{2}$  N. sulphuric acid, with phenolphthalein as indicator. The presence of free tartaric acid, or any other acid, will, of course, interfere with the direct titration. The substances should, therefore, be previously tested as follows: About 2 or 3 Gm. of the substance is shaken up in a test-tube with a few cubic centimeters of water, and the liquid is filtered. A few drops of a strong solution of normal potassium tartrate, saturated with potassium hydrogen tartrate, are then added, when, in the presence of free tartaric acid, potassium hydrogen tartrate will be thrown down, both liquids being already saturated with this substance.—Pharm. Jour., April 11, 1896, 281–282.

*Sodium Bitartrate—Errors in Directions for Preparing the U. S. P. Test Solution.*—W. A. Puckner calls attention to some errors in the U. S. P. directions for preparing sodium bitartrate, and from it the test solution. The solubility of the salt is not as great as is there indicated for the preparation of the salt, which promises a solubility of 1 : 0.26 parts of hot water, whereas the true solubility—on the authority of C. F. Buchholtz—is 1 : 0.50 parts of boiling water. The latter also gives the solubility of the acid sodium tartrate to be 1 in 8.9 parts of water at the ordinary temperature. The U. S. P. test solution is directed to be made by dissolving 1 Gm. of the salt— $\text{NaHC}_4\text{H}_4\text{O}_6 + \text{H}_2\text{O}$ —in 4 Cc. of water, a manifest error, since the solubility of the salt is not even as great as found by Buchholtz, the author having determined that water at 20° C. will dissolve only 1 part of the salt in 11.52 parts. He therefore suggests that the U. S. P. formula be corrected, so that for the preparation of the salt 150 Gm. of tartaric

acid are directed to be dissolved in 400 Cc. of hot water instead of in 100 Cc. as now directed, if it is desired to retain the present method of preparation and manipulation, and that the test solution be prepared by dissolving 1 Gm. of the salt in 12 Cc. of water. The author, however, prefers the following method for the preparation of the salt: Dissolve 75 Gm. of tartaric acid in 500 Cc. of water, neutralizing the solution accurately with sodium bicarbonate, and add a solution of 75 Gm. of tartaric acid in 100 Cc. of water, with constant stirring. A copious crystalline precipitate of acid sodium tartrate is thus formed in a short time, which is collected and dried.—West. Drugg., Jan., 1896, 6.

*Filicic Acid—Determination by Means of Copper Acetate.* See *Oleo-Resin of Male Fern*, under "Pharmacy."

*Colutic Acid—A Constituent of Colutea arborescens.*—G. Barbey describes a new acid which he has isolated from the leaves of bladder senna, *Colutea arborescens*. It is insoluble in cold water, but soluble in sixty times its weight of boiling water, from which it crystallizes on cooling in spangles. It crystallizes from alcohol in fine needles, is soluble in chloroform and in carbon disulphide, melts at 136.5° C., reddens litmus, and forms salts with soda and with ammonia. It resembles the phenols in some of its reactions, and in others seems to be analogous to cinnamic acid.—Pharm. Jour., Sept. 28, 1895, 261; from L'Union Pharm., xxxvi., 389.

*Amygdalic (Phenylglycolic) Acid—A New Process for its Preparation.*—C. Pape, finding that the production of amygdalic acid by the addition of hydrocyanic acid to benzaldehyde is attended with some difficulties, devised the following simplified method which yields abundantly. In place of benzaldehyde he added to its alkali bisulphite compound in aqueous solution a concentrated aqueous solution of potassium cyanide, from which the nitril of amygdalic acid at once separates in form of a yellow oil, the reaction being completed in nearly quantitative proportions in a few minutes. The saponification of the nitril and isolation of amygdalic acid is accomplished by treatment with three times its volume of concentrated sulphuric acid, and the crude amygdalic acid may then be purified in the usual manner. The new method is important for the industrial production of *tussol* (antipyrine-amygdalate), but is of advantage only to the owner of the patent.—Pharm. Centralh., Mar. 12, 1896, 160; from Chem. Ztg., 1896, 90.

*Picric Acid—Value as an Application to Burns.*—Filleul recommends the application of a gauze-bandage—saturated with a hot solution of picric acid and allowed to cool—to the wounds from burns, the blisters being first carefully punctured. The action is antiseptic and soothing, the only disadvantage being the persistent yellow coloration upon all objects that come in contact with picric acid.—Pharm. Centralh., Oct. 10, 1895, 585; from Rép. de Pharm., 1895, 353.



**Carbazol—Color Reaction.**—According to Carrara, a deep blue violet substance, readily soluble in water and in alcohol, is produced when a mixture of 2 mol. carbazol and 1 mol. salicylaldehyde is heated a few minutes on a water-bath with twice its weight of concentrated sulphuric acid. The nature of the coloring matter has not yet been determined.—Pharm. Centralh., Aug. 8, 1895, 452; from Gazz. Chim. Ital.

**Tanning Materials—Effect of Different Temperatures in Extraction.**—J. Gordon Parker and H. R. Procter communicate the results of an investigation made with the view to determine what ratio the tannin (in the sense of tannin matters absorbed by hide powder) in various tanning materials bears to the coloring matter, and how the same is affected by extracting at different temperatures. To extract the tanning and coloring matters a suitable quantity of the tanning material in moderately fine powder was placed in a beaker, at the bottom of which was some pure silver sand, into which a syphon-filter was inserted. The material was covered with distilled water, allowed to macerate for about sixteen hours, then heated in a water bath so that a thermometer inside the beaker reached the required temperature, and the extraction commenced; the liquor, as it syphoned slowly over, being replaced by water of the same temperature as that required for extraction until a definite quantity of percolate was obtained—the method being identical in each case. The solution was allowed to cool, filtered, analyzed, and measured in a half-inch cell Lovibond's tintometer, and the results calculated for a half per cent. solution of tanning matter. The total colors are expressed numerically in terms of standard glass. The analyses of tannin were made by the hide-powder filter method. The results are shown by the following table in percentages of the highest amount of tanning and coloring matters obtained:

Tempera- ture of Extraction, Degrees C.	Oak Bark.		Myro- balans.		Smyrna Valonia.		Greek Valonia.		Natal Mimosa.		Sumach.		Que- bracho Wood.		Mangrove Bark.	
	Tannin.	Color.	Tannin.	Color.	Tannin.	Color.	Tannin.	Color.	Tannin.	Color.	Tannin.	Color.	Tannin.	Color.	Tannin.	Color.
15.....	61.9	57.4	79.2	97.4	70.5	74.6	64.0	67.3	66.2	51.1	70.0	63.6	35.0	71.3	61.6	64.7
15-30.....	70.7	64.5	83.6	82.5	74.5	78.0	72.4	70.0	90.6	54.2	86.7	51.8	46.5	68.7	76.3	69.8
30-40.....	83.5	76.1	89.8	82.7	86.2	76.2	84.4	68.0	94.0	56.5	91.1	51.8	54.4	65.2	82.4	71.7
40-50.....	84.2	80.0	93.0	84.4	86.2	74.6	94.4	65.9	94.4	61.8	99.0	52.9	69.5	60.0	87.7	73.8
50-60.....	87.6	84.0	96.4	87.6	100.0	76.2	99.2	71.6	95.0	79.9	100.0	56.5	76.0	60.4	96.2	72.8
60-70.....	95.5	92.7	96.6	89.3	99.0	84.7	100.0	75.8	98.4	81.6	93.6	66.6	80.0	59.9	94.7	90.0
70-80.....	95.7	98.7	96.8	94.1	99.5	84.7	98.4	82.3	100.0	85.5	89.1	72.8	88.0	67.4	96.7	82.8
80-90.....	100.0	93.2	97.4	96.7	95.0	84.7	96.0	85.8	96.2	93.8	83.2	82.7	100.0	74.3	100.0	73.8
90-100.....	100.0	94.6	100.0	97.0	94.0	90.6	94.4	92.0	94.0	100.0	81.7	87.7	89.8	100.0	95.7	100.0
Boiled one half hour.	93.7	100.0	98.1	100.0	90.6	100.0	88.8	100.0	91.8	98.4	74.8	100.0	.....	.....	.....	.....

These results are highly interesting, and they show that while every one of the tanning materials has peculiarities of its own in the vats in which

they are extracted at different temperatures, many of them are extracted more readily at about 60° C. than at a higher temperature, whilst the coloring matters, with some irregularities also, are extracted progressively at the higher temperatures.—*Amer. Jour. Pharm.*, Dec., 1895, 629-632; from *Jour. Soc. Chem. Indust.*, July 31, 1895.

*Tannins—Investigations of Some, in Plants of the Ericaceæ.*—Bertha L. DeGraffe contributes a comprehensive paper in which she records investigations to establish the character of the tannins in the following drugs derived from plants of the *Ericaceæ*, viz., uva ursi, gaultheria, chimaphila, manzanita, mountain laurel, and trailing arbutus. The method of extracting the tannin from the air-dried and ground material was by percolation with acetone, recovering the solvent from the percolate, treating the residual semi-solid extract with water, mixing the solution with paper pulp, and filtering through cotton. The filtrate was repeatedly shaken out with acetic ether as long as it removed tannin, and the crude tannin obtained on evaporation of the acetic ether solution was repeatedly treated with water and paper pulp, and shaken out with ether, as long as resinous and non-tannin substances were separated by this treatment. The tannins were finally obtained upon the last recovery of the ether in a porous or puffed-up condition; the tannin of trailing arbutus, gaultheria and mountain laurel having a light reddish tinge, while those of uva ursi, manzanita and chimaphila were of a straw yellow color. To still further purify the tannins they were in some cases dried at 120° C. and shaken with absolute ether, in others their aqueous solutions were shaken out with ether, but in all cases the tannins became colored on drying.

Qualitative tests were made with the purified substances to determine the group to which the several tannins belonged, and decompositions were made with the same purpose in view, but in neither case with entirely satisfactory results. Ultimate analyses of the principles were finally made, with results that point out that the tannins of uva ursi and manzanita belong to the gallotannic acid group, while those of gaultheria, trailing arbutus and mountain laurel belong to the oak-bark group. As to the tannin of chimaphila, it was not obtained pure enough to assure the reliability of the combustion figures, which do not agree with the tannin of either group; but the author is of the opinion that it belongs to the oak-bark group.—*Amer. Jour. Pharm.*, June 1896, 313-321.

*Tannin.*—A constituent of an exudation product of *Pterocarpus Draco*, Linné (Jamaica Dragon's Blood) which see, under "Materia Medica."

*Tannin—Pharmaceutical Test for the Strength of its Solutions.*—Barnard S. Proctor recommends the following expeditious test to determine the strength of tannin solutions. A test solution is prepared by mixing  $\frac{1}{2}$  ounce each of tinct. ferri perchlor. B. P. and liquor ammon. acet. fortior, and bringing the mixture to 2 ounces by the addition of methy-

lated spirit (alcohol will answer as well? Rep.). This solution will effect complete precipitation of an equal volume of a solution of 1 drachm of tannin in 2 ounces; or, 16 minims of the test solution will precipitate 1 grain of tannin. The test is most conveniently applied as follows: A number of spots are made upon white blotting paper, by letting drops of the iron solution fall upon it. Then mix half an ounce of the tannin solution (a gargle, for instance) with an equal volume of methylated spirit (alcohol? Rep.), add to this half a drachm of the iron solution, stir well, and let a drop of the mixture fall upon the blotting paper very near to one of the iron drops, so that the spreading of the liquor in the substance of the paper causes the filtered margin of the drop to come into contact with the iron stain, where it will cause a dark line if the tannin be still in excess. Further additions of iron liquor to the tannin solution are made in the same way, making the additions smaller as the increasing faintness of the dark line of contact indicates that the neutral point is approaching. When this dark line ceases to be produced, the quantity of iron liquor used is ascertained, and for every 16 minims consumed 1 grain of tannin is calculated to be present in the half ounce of tannin liquor tested.—Pharm. Jour., Nov. 30, 1895, 456.

*Iodotannin.*—*Preparation of an Efficient Syrup.*—See *Iodotannin Syrups*, under "Pharmacy."

*Copper Tannate*—*A Preventative of Mildew (Perenospera viticola) on Plants*—Joné and Crouzel recommend a solution of copper tannate for sprinkling plants—tomatoes, potatoes, grape-vines, etc.—for the prevention of mildew. The copper, being in combination with an organic acid, does not affect the plants unfavorably, as is the case with other salts of copper, which unite with the tannin of the young plants. The solution is prepared as follows: 20 Kgm. of oak or pine bark, or better, 10 Kgm. of fir bark, are boiled for an hour with 50 liters of water, making up the evaporated water from time to time. The liquid is decanted, a solution of 1 Kgm. of copper sulphate in 3 liters of water is added, and the whole is brought to the volume of 100 liters.—Pharm. Centralh., July 11, 1895, 407.

*Mercurous Tannate*—*Determination of Mercury.*—C. Glücksmann observes that the quantity of mercury in mercurous tannate varies from 25 to 52.8 per cent. He regards 50 per cent. of mercury as being a reasonable percentage, and recommends the following method for its quantitative determination: One gram of the tannate is dissolved in 10 Cc. of aqua regia upon a water-bath, the solution is diluted with 50 Cc. of water, filtered into a beaker, and the filtrate washed with 50 Cc. of water. To the filtered solution of chloride so obtained, 50 Cc. of a 10 per cent. solution of barium hypophosphite, and 5 Cc. conc. hydrochloric acid are added, and the mixture is well stirred. The precipitated mercurous chloride is collected on a filter, and is washed until the washings no longer indicate the presence

of barium salt with dilute sulphuric acid. The mercurous chloride is then washed into a beaker, dissolved in 50 Cc. of normal iodine solution, with addition of a little potassium iodide; the solution is decolorized with  $\frac{1}{10}$  N. sodium thiosulphite solution, a little starch solution is added, and it is then titrated with  $\frac{1}{10}$  iodine solution until a faint blue color is developed. The calculation is made in the same manner as in other iodometric determinations.—Pharm. Centralh., April 2, 1896, 209; from. Ztschr. *Cest. Apoth. Ver.*, 1896, No. 3.

*Bismuth Subtannate—Method of Preparation.*—In connection with his recent experiments upon bismuth subgallate (which see), Ferd. A. Sieker has made experiments to determine a method for preparing a corresponding bismuth subtannate. Experiments with tannic acid and bismuth subnitrate were unsuccessful, but upon treatment of the normal bismuth nitrate  $\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$ , with solution of pure tannic acid, he obtained a compound, the composition of which corresponded to the formula  $\text{C}_{14}\text{H}_7\text{O}_6\text{Bi}_2\text{H}_2\text{O}$ , or  $\text{C}_{14}\text{H}_5\text{O}_6\text{Bi}(\text{OH})_2$ , both of which demand 41.5 per cent. of  $\text{Bi}_2\text{O}_3$ . To obtain this 233 parts of normal bismuth nitrate was rubbed to a powder in a porcelain mortar, and a solution of 170 parts of tannic acid in 1000 parts of water was added under constant stirring with a pestle; then another 1000 parts of water were added and the mixture set aside for several hours. It was then washed by decantation until the washings were no longer acid, collected on a filter, and dried, first at the ordinary temperature and finally at about  $60^\circ \text{C}$ . for a short time. Bismuth subtannate prepared in this way is a voluminous, impalpable canary-yellow powder, resembling the subgallate in appearance, but may be distinguished from the latter by being but very slowly soluble in a 50 per cent. solution of sodium hydroxide at the ordinary temperature, though readily soluble in a boiling solution. The subgallate dissolves almost instantly in a cold solution of sodium hydroxide.—Pharm. Rundschau, April, 1896, 85–86.

*Bismuth Subgallate—Methods of Preparation.*—In a former paper (see Proceedings 1895, 673) Fred. A. Sieker had given two methods for preparing bismuth subgallate, preference having been given to one in which gallic acid was caused to act upon bismuth subnitrate in the presence of water at  $50^\circ \text{C}$ . Experience has since shown that all bismuth subnitrates are not adapted for this method, some forming a product not entirely soluble in a solution of sodium hydroxide, owing to the presence of uncombined oxide. As pointed out recently by Prof. Curtman (see p. 716), commercial bismuth subnitrates vary considerably in composition, and the author finds that bismuth subnitrate assaying a high per cent. of  $\text{Bi}_2\text{O}_3$  will not form a pure subgallate. In selecting, therefore, a subnitrate for preparing the subgallate, he recommends that the  $\text{Bi}_2\text{O}_3$  be determined, and if it assays over 80 per cent., treat a small quantity with six times its weight of water and 0.81 times as much gallic acid as there is  $\text{Bi}_2\text{O}_3$  in the

quantity of subnitrate employed. Then, instead of heating to  $50^{\circ}\text{C}$  as previously recommended, heat to  $60^{\circ}$ – $65^{\circ}\text{C}$ . for several hours, and if the product is perfectly soluble in a solution of sodium hydroxide, the subnitrate is acceptable for the purpose. The method yields, as previously stated, a very voluminous impalpable powder, which possesses certain advantages over the heavier salt obtained by direct precipitation. A third, very simple, method consists in treating 466 parts of powdered normal bismuth nitrate with a warm ( $40^{\circ}\text{C}$ .) solution of 188 parts of gallic acid in 4000 parts of water. The resulting subgallate, which should be rapidly washed until the washings no longer redden litmus, *and no further*, has a beautiful yellow color, and is perfectly soluble in solution of sodium hydroxide.—Pharm. Rundschau, April 1896, 85.

#### ORGANIC BASES.

*Alkaloids—Acidimetric Estimation*,—Lyman F. Kebler gives in considerable detail the results of some investigations made primarily with the object of ascertaining what indicators are best adapted to the titration of alkaloids. Incidentally gravimetric methods of determining alkaloids formed part of the work, in order to determine the reliability of the acidimetric methods. Of five indicators that seemed adapted for the purpose (the preparation and use of which is described), hæmatoxylin, Brazil wood and cochineal gave the most promising results, their adaptibility being in the order in which they are named. Litmus solution is unsatisfactory for delicate titrations, while methyl orange proved quite unsuitable. Respecting the availability of the acidimetric method for the estimation of alkaloids further experiments are necessary, but the author expresses the hope that in the near future all gravimetric results will at least be supplemented by volumetric methods, if not displaced by them. While the results by the gravimetric method are uniformly higher than by the volumetric method, from the hundreds of assays made by him he feels justified in stating that all gravimetric processes yield products containing considerable non-alkaloidal matter.

Of practical interest is the author's observation that the formation of obstinate emulsions that embarrass many of the processes commonly employed for the extraction of the alkaloid from crude drugs, is almost completely overcome by the method employed by him. This is a modification of Keller's process, and is carried out as follows: Place 10 grammes of the dry drug into a 250 Cc. flask, add 25 grammes of chloroform and 75 grammes of ether, stopper the flask securely, agitate well for several minutes, add 10 grammes of 10 per cent. ammonia water, and agitate frequently during one hour. On adding 5 grammes more of 10 per cent. ammonia water and shaking well, the suspended powder agglutinates into a lump, the liquid becomes clear after standing a few minutes and can be poured off almost completely. It is then treated by one of the following methods:

*a.* When the mixture has completely separated, pour off 50 grammes into a beaker, evaporate the solvent on a water bath, add 10 Cc. of ether and evaporate again. Dissolve the varnish-like residue in 15 Cc. of alcohol, with heat, add water to slight permanent turbidity, the requisite quantity of indicator and an excess of the (volumetric) acid solution; retitrate with centinormal alkaline solution.

*b.* When the mixture has completely separated, pour 50 grammes into a separatory funnel, treat at once with 20 Cc. of acidulated water; after thorough agitation and complete separation, remove the aqueous solution into a second separatory funnel. Repeat the above operation twice more successively with 15 Cc. of slightly acidulated water. The acidulated water in the second separatory funnel is rendered alkaline with ammonia water, the alkaloid removed, successively, with 20 Cc., 15 Cc., and 15 Cc. of a mixture of three parts (by volume) of chloroform and one part of ether. Collect the chloroform-ether mixture in a tared beaker, and distill off the solvent. The varnish-like residue is twice treated with 8 Cc. of ether, evaporated on a water-bath and dried to constant weight on a water-bath. The varnish-like residue may then be dissolved in 15 Cc. of alcohol and treated (acidimetrically) as under *a*, the second process (*b*) thus supplying both a gravimetric and acidimetric method.

In the author's experience the amount of alkaloids obtained by process *B* is, as would naturally be expected, smaller than by process *A*. Of many assays made by this process, as modified by the author, not more than one per cent. formed emulsions. The paper is followed by a comprehensive bibliography, embracing the literature on the acidimetric estimation of alkaloids from 1846-1895, and the more valuable literature on indicators during the last two decades.—*Am. Jour. Phar.*, Oct. 1895, 499-509.

*Alkaloidal Drugs—Methods of Assaying.*—Oscar Dilly observes that the next advance in pharmacy, along the lines of preparations made from drugs containing alkaloids as their active constituents, will be the making of extracts and tinctures from them by methods that will guarantee the content of an absolute and regular percentage of the alkaloids. Three methods have been proposed for this purpose: the gravimetric method, depending upon the direct weighing of the alkaloid obtained from a sample of the drug or its preparation; the method of titration with Mayer's reagent; and the volumetric method, depending upon the determination of the alkaloid by titration with volumetric acid. This last-named method the author regards as the one to be preferred; it is genuinely scientific, being marked by sharp chemical reactions that admit of no doubt, showing the exact amount, whether large or small, of the alkaloid present. In comparative assays using the three methods, the results obtained by volumetric analysis are more constant. The instruments needed are few in number: a glass separator, a few beakers, a Cc. cylinder for making volumetric solutions, an accurate balance and weights, and two burettes cali-

brated into one-tenth Cc., one for alkaline and the other for acid solutions, are the essentials necessary.—Proceed. Ky. Pharm. Assoc., 1895, 46-51.

*Organic Drugs—Importance of Valuation by Methods of Assay.*—C. R. R. Beck has contributed a paper in which he gives practical hints on the value of organic drugs admitting of determination by assay. The drugs that are considered in this paper are cinchona, aconite, belladonna, digitalis, hyoscyamus, nux vomica, cantharides, gelsemium, ipecacuanha, jaborandi, and opium. The author sums up the whole field presented in his paper by the unquestionable fact that there exists great variation in the natural production of medicinal agents, with a consequent danger in the use of undetermined preparations, and with greater danger from adulteration and sophistication. All of this would but reasonably suggest that every pharmacist be able to prove the quality of the preparations with which he compounds his prescriptions and makes the medicines which he sells over his counter. To do this, he must possess the advantage of the advanced information and appliances which our pure food and drug laws and intelligent communities require, and our pharmaceutical educational institutions are prepared to impart.—Proc. Maryland State Pharm. Assoc., 1895, 34-41.

*Periodides of the Alkaloids—Application as Molecular Forms for Volumetric and Gravimetric Estimation.*—Professor Albert B. Prescott observes that it is manifest that a clear understanding of molecular forms is the ground-work of quantitative analysis, inorganic or organic. When the molecular constitution of the compound that is produced in a quantitative operation is well known, then the way is open for an intelligible study of the conditions of the operation, and for an exact measure of the physical constants of the product of the operation. In estimating alkaloids, in many cases there is no other method than to separate the free base as nearly pure, and with as little waste as possible, and take the weight as it is. This direct determination is quite practicable for such sharply defined bodies as the alkaloids, with their clearly drawn limits of solubility. But the same strong chemical individuality goes still more to strengthen methods of estimating the alkaloids as compounds. So sharply cut are their reactions, it is reasonable to expect the best quantitative methods based on their reaction of combination. Alkaloids combine by addition, and the compounds most used, hitherto, in their estimation may be enumerated about as follows, giving precedence to those which have been used earliest for the purpose: 1. The platinum (and gold) chlorides of the alkaloids. 2. The mercury (bismuth, etc.) iodides.

3. The phosphomolybdates (other conjugated phosphates; picrates).

4. Their common salts, as concerned in their volumetric reactions with acid and with fixed alkali, using selected indicators for free alkaloid.

5. The periodides, and other perhalides.

The author briefly reviews these various methods, and their value for

estimating alkaloids, but his present paper is more particularly concerned with their estimation as periodides, which, he observes, are more than addition compounds of the alkaloids, they are halogen addition compounds as well. In his previous studies of both organic and inorganic periodides (the results of some of which will be found in this report), it has become manifest that the pyridine periodides taken as a type are clear cut, in crystalline form, and not too unstable for close accord of successive iodine estimations. Similarly Dr. Gomberg finds that caffeine with a mineral acid, as HCl, forms a delightfully stable periodide, giving sharp volumetric estimations, although caffeine in neutral solution does not combine with iodine, or not directly nor readily. In the present installment of Prof. Prescott's very interesting paper, unfortunately the application of a method of estimating alkaloids by their molecular forms as periodides is not reached, the remainder of this installment being confined to a consideration and description of pyridine alkyl periodides, the periodides of the amine and of the tertiary ammonium bases; to the estimate of iodine in periodides; to the characterization, etc., of the dipyridine normal iodides, of the pyridine alkyl normal iodides, and of the pyridine alkyl hydroxides. The subject must therefore be deferred for the next report.—Pharm. Rundschau, June, 1896, 123-130.

In a second paper Professor Prescott communicates his experiments and studies in connection with the preparation of the

*Periodides of Pyridine*, in which he was assisted by T. F. Trowbridge. Without going into the details given, these may be briefly mentioned and characterized as follows:

*Pyridine Methyl Pentiodide*, obtained in three preparations, one in long greenish black needles, the other two in very hard and compact greenish-black crystals, melting respectively at  $47.5^{\circ}$ ,  $47^{\circ}$ , but the third preparation, on recrystallization from alcohol, appearing in greenish-black crystalline powder, and melting at  $43^{\circ}$  C. They were comparatively stable, the container being just perceptibly stained by iodine after keeping, most of the time in the dark, for eight months. Analytical results correspond to the formula  $C_5H_5N, CH_3I, I_5$ .

*Pyridine Methyl Diiodide*, obtained in two preparations, as reddish brown crystals, thick plates, compact in clusters. Very stable, and melting at  $91.5^{\circ}$  C. Composition corresponds to formula  $C_5H_5N, CH_3I, I_2$ .

*Pyridine Methyl Triiodide*, obtained in four preparations, in dark-red needles, in some loose in others clustered, perfectly stable, one preparation melting at  $48^{\circ}$  C., another at  $49^{\circ}$ – $50^{\circ}$  C., and the other at  $50^{\circ}$  C. Composition corresponding to  $C_5H_5N, CH_3I, I_3$ . A compound having the elemental figures of a

*Pyridine Methyl Tetrapentaiodide* in well-defined greenish-black, lustrous, long needles, was also obtained, melting at  $44^{\circ}$  C., and a compound, provisionally named



*Pyridine Methyl Octaiodide*, is also described. It is greenish-black, occurs in both plates and needles, and melts at about  $26^{\circ}\text{C}$ ., and is fairly stable.

*Pyridine Ethyl Triiodide*, was obtained in three samples. It occurs in well-defined stable, lustrous, greenish black needles, melting at  $49^{\circ}\text{C}$ ., and having the composition  $\text{C}_5\text{H}_5\text{N}, \text{C}_2\text{H}_5\text{I}_3$ .

The foregoing are all the "pyridine alkyl periodides" prepared and described by the authors. They have also prepared the periodides of the amine and of the tertiary ammonium bases.

*Pyridine Tetraiodide*,  $\text{C}_5\text{H}_5\text{N}, \text{I}_4$ , was obtained in three samples, one recrystallized from benzene, one from chloroform, and the third from alcohol. In each result the crystals were dark, lustrous green, not of a red color as reported by Dafert, and melted at  $85^{\circ}\text{C}$ . The

*Pyridine Hydrogen Pentiodide*, of Dafert, was also obtained by the authors by following Dafert's method in crystals such as are described by him, but melting at  $85^{\circ}\text{C}$ ., while Dafert's product melted at  $89^{\circ}\text{C}$ .

Full particulars are given concerning the method of preparation of all the foregoing compounds, as well as of the method employed for the estimation of the iodine in the periodides.—Journ. Amer. Chem. Soc., xvii, No. 11, Nov., 1895; from Reprint.

In a third paper Professor Prescott gives the results of his studies and experiments upon a number of pyridine alkyl iodides, containing only a single molecule of iodine. The

*Pyridine Methyl Iodide* was obtained in colorless crystals or flat pencils, sometimes aggregating as in rosettes. They are very soluble in water, soluble in alcohol, methyl alcohol, chloroform, acetone, and in glacial acetic acid, but not soluble in ether, or benzene, or carbon disulphide. The crystals are very slowly deliquescent, and melt at  $117^{\circ}\text{C}$ .

*Pyridine Ethyl Iodide* was obtained in colorless plates, permanent or slightly deliquescent, soluble in water, alcohol, methyl alcohol, acetone, and glacial acetic acid, slightly soluble in ethyl acetate, but insoluble in ether, chloroform, benzene and in carbon disulphide. They melt at  $90.5^{\circ}\text{C}$ .

*Pyridine Propyl Iodide* ( $\text{C}_5\text{H}_5\text{N}, \text{CH}_3\text{CH}_2\text{CH}_2\text{I}$ ) forms colorless, platform, deliquescent crystals, soluble in water, alcohol, amyl alcohol, methyl alcohol, and in benzene, but insoluble in ether and in chloroform. They melt between  $52^{\circ}$  and  $53^{\circ}\text{C}$ .

*Pyridine Isopropyl Iodide* ( $\text{C}_5\text{H}_5\text{N}, (\text{CH}_3)_2\text{CH}_2\text{I}$ ) occurs in colorless crystals, soluble in water, alcohol of 95 per cent., and in ethyl acetate; less freely soluble in absolute alcohol, amyl alcohol, or chloroform; insoluble in ether. They melt at  $114^{\circ}$  to  $115^{\circ}\text{C}$ .

The paper concludes with a comparison of the melting points of these quaternary base iodides, and others, and of a number of quaternary base metallic chlorides.—Journ. Amer. Chem. Soc. xvii, No. 12, Jan., 1896; from Reprint.

*Alkaloidal Iodates—Description of Several.*—E. Merck describes several alkaloidal iodates as follows :

*Atropine Iodate* occurs in colorless needles, soluble in water and in alcohol. Its solution appears to keep free from germs for a long time without the addition of antiseptics, and is therefore recommended as preferable to other atropine salts, over which it is said to have the further advantage of producing mydriasis more promptly. For this purpose it is recommended in form of  $\frac{1}{2}$  per cent. to  $2\frac{1}{2}$  per cent. solution.

*Codeine Iodate* occurs in white needles, not very stable, and difficultly soluble in water and in alcohol.

*Quinine Iodate* occurs in the form of a white crystalline powder, soluble in water.

*Scopolamine (Hyoscine) Iodate* forms colorless crystals, soluble in water and in alcohol. Its action is stated to be two or three times as energetic as that of its halogen salts, a dose of 0.0001 to 0.00015 being sufficiently active for ordinary purposes.

*Strychnine Iodate* is in form of long, colorless, crystalline tufts of needles, which are soluble in water.—Pharm. Centralh., Feb. 13, 1896, 91.

*Alkaloidal Sulphocyanides—Antiseptic Action, etc.*—Some time ago Edinger recommended the use of the sulphocyanides of several organic bases as antiseptics. Müller has now proposed the following and investigated their antiseptic value :

*Chinolin sulphocyanide*,  $C_9H_7N, H, SCN$ , forms white crystals, which melt at  $140^\circ$ , are soluble to the extent of 3.5 per cent. in cold water and very readily soluble in hot water. It possesses antiseptic action.

*Chinolin benzyl sulphocyanide*,  $C_9H_7N, CH_2, C_6H_5, SCN$ , is a yellow powder having a faint aromatic odor, melting at  $98^\circ$ , and soluble to the amount of 1.3 per cent. in water, but more readily dissolved by alcohol, and in warmed glycerin. It possesses antiseptic properties, but is irritating when applied to the mucous membrane of the eye or to wounds.

*Oxychinolin methyl sulphocyanide*,  $HO, C_9H_6N, CH_3, SCN$ , occurs in greenish-yellow crystals or a light, yellow powder, melts at  $83^\circ$ , and is soluble in water and in alcohol, but not in glycerin. It does not appear to have marked antiseptic value.—Pharm. Centralh., March 28, 1896 : from Hygien. Rundschau, 1895, 1055.

*Stearates of Alkaloids—Preparation and Characters.*—Stearates of the alkaloids are recommended by F. Zanardi as being more efficient than the free alkaloids for inunctions, and he describes several of them, as well as the process for preparing

*Morphine stearate* ( $C_{17}H_{19}NO_3, C_{17}H_3COOH$ ). This may be made by double decomposition between morphine hydrochloride and sodium stearate, or direct from its components, as follows : One molecule of stearic acid (5.68 Gm.) is dissolved in 100 Cc. of absolute alcohol at a moderate heat, and one molecule (5.72 Gm.) of morphine is added in

small quantities at a time until solution is effected. The solution is filtered and on cooling deposits morphine stearate in form of white glistening scales. This stearate is freely soluble in hot alcohol, and soluble in oil, and fats at the ordinary temperature in proportion of 1 : 100. It melts at  $84^{\circ}$  to  $86^{\circ}$ , but is decomposed at  $100^{\circ}$  C. In a similar manner

*Atropine stearate* may be obtained. It forms white, glistening needles having the same solubilities as the morphine stearate, but melting at  $120^{\circ}$  and decomposing at  $170^{\circ}$  C.

*Cocaine stearate*, in white glistening needles united in form of bundles, melts at about  $90^{\circ}$  C., and has similar solubilities to the two before described. —Pharm. Centralh., May 21, 1896, 313; from Bollet. Chim., Pharm., 1896, 4.

*Morphine—New Reaction.*—G. Bruylants calls attention to a new reaction of morphine, which is remarkable because the same reagent, under different conditions, produces two distinct reactions. If the morphine is dissolved in one or two drops of sulphuric acid, spread out on a porcelain surface, and an equal quantity of Fröhde's reagent (1 Cgm. molybdate in 1 Cc. acid) is added, a lilac color is produced, as is well known; but if the experiment is repeated by heating the morphine and sulphuric acid on the steam bath, and then adding the reagent, a splendid green color is produced, which lasts for some time. Then, if we introduce into the still green liquid—from a fresh portion—a fragment (grain?) of nitre, the green immediately changes to a red color, which grows paler in time, and finally changes to yellow. The latter is known as "Huseman's" reaction; but it is generally supposed that the morphine and sulphuric acid must be heated for half an hour, before applying the test. This is erroneous, for in the author's experience one or two minutes will be found sufficient. The author gives a table in which he shows the reactions under the conditions given in the foregoing, not alone with morphine, but also with other opium alkaloids, which see in Chem. News, Aug. 2, 1895, 52; from Bull., Soc. Chim. (3), xiii-xiv., No. 9, 498.

*Morphine—Forensic Separation from Cocaine.*—The separation of morphine and cocaine in forensic cases is recommended in "Pharm. Ztg." to be done as follows: Add sufficient sodium carbonate to the aqueous or acid solution to render it slightly alkaline, and shake out the solution repeatedly with ether. The residual aqueous fluid is heated to drive off dissolved ether and ammonium chloride added, after which it is shaken out with amyl alcohol. The ether solution contains the cocaine, the amyl alcohol solution the morphine, both of which are obtained by evaporation of the respective solvents.—Amer. Druggist, April 10, 1896, 216.

*Morphine—Correction for Impurity of Alkaloid in Opium Assaying.*—Lyman F. Kebler contributes the results of some interesting experiments

made with reference to the several methods for obtaining corrections for the amount of impurity associated with the crude morphine from opium assays. So far as determining the impurities is concerned, the author gives preference in the order named to the various methods in use: the ash method, titration, lime water method, absolute alcohol. By the ash method the amount of pure morphine in a mixture of 30 assay samples was determined to be 97.59 per cent.; the titration method gave results indicating from 97.59 per cent. (with haematoxylin as indicator), to 100.02 per cent. (with methyl orange as indicator). The lime water method gave 98.22 per cent., and the absolute alcohol method 98.33 per cent. A comprehensive series of assays was made from one sample of powdered opium, allowing the separation of the crude morphine to take place during periods ranging from three to thirty-six hours. The results, given by the author in the form of a comprehensive table, lead to the conclusion that a correction is unnecessary for a well executed assay; that is, allowing twelve to sixteen hours for precipitation and adhering closely to the text, the amount of crude morphine will not exceed the percentage of pure morphine in the sample.—*Amer. Jour. Phar.*, Aug., 1895, 398-400.

*Morphiometric Assay—Inefficiency of Present Methods of Correction.*—Lyman F. Kebler observes that notwithstanding the numerous and exhaustive investigations on the analysis of opium, the morphiologist is constantly encountering new difficulties in the course of his work. The failure of the U. S. Pharmacopœia to require the application of a correction to the crude morphine obtained by the prescribed process contributes to these difficulties, and has left an unguarded avenue for the clever adulterator, which the author has reason to believe has been taken advantage of. In a previous paper (see above) the author had experimented with several methods for applying a correction to the crude morphine, giving preference to the ash method, but also advocating the method of titration with volumetric acid solutions. Dr. Dott, in a recent paper (*J. Soc. Chem. Med.*, 1896, 15, 91), has now expressed the opinion that an adulterated opium could be detected by dividing the crude opium into three parts, and estimating the impurity in one part by the ash method, treating a second part with barium hydroxide, while a third part is to be titrated with volumetric acid solution. Mr. Kebler has now determined the impurities in 17 samples of crude morphine selected at random from about 155 assays made during the year, employing the ash method, lime water process, and titration with volumetric acid solution, and has obtained results—given in a table—which indicate that the present methods of applying corrections are unsatisfactory. In the case of three samples that had been selected for morphine that would not need correction, the results by the several methods would indicate them to contain the largest amount of impurity. In three other cases the amount of impurity determined by the ash method was from four to six times as great as that determined by the lime water process.—*Amer. Jour. Pharm.*, May, 1896, 257-259.

*Apomorphine—Preparation and Preservation of a Colorless Solution.*—A correspondent of the "Pharm. Ztg." observes that he has no difficulty in preserving solutions of apomorphine free from color, by preparing a 1 per cent. solution with the aid of hydrochloric acid, and then keeping it in a cool place. A comparatively slight rise in temperature invariably produces red coloration.—Amer. Drugg., April 10, 1896, 215.

*Codeine—Adulteration with Sugar.*—Etivevasst calls attention to an adulteration of codeine with sugar crystals, which very much resembles in appearance the codeine itself. A reaction was readily obtained with Fehling's solution after the inversion of the sugar with sulphuric acid.—Amer. Drugg., April 10, 1896, 215; from Annales de Pharm.

*Apocodeine Hydrochloride—Value as an Expectorant, and as a Sedative in Mania.*—Meder agrees with Murrel that apocodeine salts act chiefly as an expectorant, but also attributes to them a marked sedative action in maniacal cases, as has already been observed by Guinard. The administration per os, as well as by subcutaneous injection, gives rise to intestinal peristalsis and produces one or two evacuations. The sedative dose is 2 to 6 centigrammes, either subcutaneously or internally.—Pharm. Jour., June 6, 1896, 454; from Therap. Wochenschr.

*Cotarnine Hydrochlorate—Value as a Uterine Styptic.*—See *Stypticin*, under "New Remedies."

*Narcotine—Antiperiodic Value.*—Under the title "Anarcotine, a neglected alkaloid of opium," Sir Wm. Roberts read a paper before the British Medical Association, in which he calls attention to the antiperiodic value of Anarcotine, or "narcotine" as it is generally called. Instances are quoted to prove that in many cases it is decidedly more efficacious than quinine.—Pharm. Jour., Aug. 10, 1895, 129.

*Isonarcotine—Synthetic Production*—C. Liebermann has succeeded in the production of isomeric narcotine by the reaction between opianic acid and hydrocotarnine in presence of sulphuric acid. The finely triturated mixture of the two substances is rapidly added to  $2\frac{1}{2}$  times its weight of sulphuric acid of about 73 per cent.  $H_2SO_4$ , which must be pure and free from nitric acid, the mixture being strongly refrigerated during this addition. After remaining in the ice-chest over night, the product is added to ice water, and filtered to remove unchanged opianic acid. The filtrate is precipitated with soda solution, and this granular precipitate is recrystallized from alcohol. *Isonarcotine*,  $C_{22}H_{21}NO_7$ , is thus obtained in white, needle-shaped crystals, which are insoluble in water and alkalies, almost insoluble in ether, but readily soluble in benzol and in alcohol. Its alcoholic solution reacts strongly alkaline. It forms sparingly soluble crystalline salts with the halogen acids. With conc. sulphuric acid it produces an intense carmine-red color, and this reaction may be utilized for the identification of hydrocotarnine, which, as well as opianic acid, forms colorless so-

lutions with concentrated sulphuric acid, but upon mixing the two solutions develops the carmine color due to the formation of isonarcotine. Isonarcotine appears to possess no marked physiological action.—Pharm. Centralh., April 9, 1896, 218; from Ber. d. D. Chem. Ges., 1896, 183.

*Quinine—Its Commercial History.*—Francis B. Hays contributes a paper entitled "The Commercial Story of Quinine," in which he gives some interesting information concerning the fluctuations in the price of quinine sulphate since its first introduction into commerce, three years after its discovery by Pelletier and Caventou in 1823. The price then was \$20.00 per oz., but it fell steadily in price, so that in 1833 it sold at \$1.75 per oz., remaining at approximately these figures—more or less—until 1839, when it rose to \$3.30 per oz. It then remained at figures ranging from \$2.40 to \$3.70 until 1858, when it again declined, reaching the low figure of \$1.40. From 1860 to 1876 it steadily maintained a high price, approximating to \$2.50, and reaching during 1863 and 1864 the figures \$3.25 and \$3.75 respectively; but in 1877 it reached the highest figures since the first decade of its introduction, namely \$4.50 per oz. Since then sulphate of quinine has steadily declined in price until, in 1892, it reached the remarkably low figure of 17 to 20 cents per oz., but has since then advanced a few cents annually, being sold in 1895 at 22½ cents for foreign quinine and 27 cents per oz. for quinine of domestic manufacture. A further advance is likely to occur during the present year.—Drugg. Circ. Feb., 1896, 32.

*Quinine Sulphate—Modification of B. P. Process of Assay.*—S. J. Lewis, after directing attention to certain imperfections in the B. P. process for the assay of quinine, proposes the following modification: Place 10 Gm. of the quinine sulphate, previously dried at 100° C., in a beaker or flask, and add 250 Cc. of distilled water, weigh the whole. Apply sufficient heat to effect solution, and set aside to cool and crystallize; add water sufficient to make the weight the same as before; stir well and filter. Place 125 Cc. of the filtrate in a bottle or flask of such size that it shall be nearly full; add ether, shaking occasionally, until a layer of about 5 Cc. of ether remains undissolved; add ammonia in very slight excess, and shake thoroughly, so that the quinine at first precipitated shall be redissolved. Set aside for some hours, or during a night. Remove the supernatant clear ethereal fluid, which should occupy the neck of the vessel, with a pipette. Wash the residual aqueous fluid and any separated crystals of alkaloid with 4 Cc. more ether, removing the ethereal layer as before, and again with 2 Cc. ether. Collect the separated alkaloid on a tared filter, dry the filter with the crystals, and pour over them 5 Cc. of ether; dry at 100° C. and weigh. Four parts of such alkaloid correspond with five parts of sulphate of cinchonine or of sulphate of cinchonidine, and its value, multiplied by 20, will be the percentage of such sulphates contained in the sulphate of quinine. Analytical data, given by the author, seem to confirm the value of his modified process.—Chem. and Drug., July 27, 1895, 134.

*Quinine Sulphate—Two New Tests.*—Prof. Kubli describes two new methods for determining in quinine sulphate the presence or absence of the other cinchona alkaloids, which he designates respectively as the *water-test* and the *carbonic-acid-test*. The *water-test* is dependent upon the fact that the sulphates of the cinchona alkaloids that may be present in quinine sulphate are all more readily soluble in water than is the latter, while their free alkaloids are all less soluble than is alkaloidal quinine. If, therefore, water is saturated with any of these neutral alkaloidal sulphates, or with a mixture of them, and a small quantity of alkali carbonate is added, a portion of alkaloid is liberated, and this requires the addition of varying quantities of water for resolution, the quantity being less for quinine alkaloid—this being the more readily soluble—than for the other cinchona alkaloids, and these differing again among each other. The method requires great exactitude in observing and maintaining the specified temperature at which the test must be made throughout, which is at  $20^{\circ}\text{C}$ ., and must not at any time be below this or above  $21^{\circ}$ . Details of the method are given, together with a lengthy table showing the results with various mixtures of quinine sulphate and the sulphates of the other cinchona alkaloids.

The *carbonic-acid test* is a microscopic method dependent upon the following observations: If a solution of neutral quinine sulphate saturated at the ordinary temperature is precipitated by sodium carbonate, the resultant precipitate is readily re-dissolved in a solution of sodium bicarbonate; if then carbonic acid is added to this solution, the quinine is deposited, and when viewed under the microscope exhibits magnificent needle-shaped crystals, mostly aggregated into bundles. These are the neutral quinine carbonate; they effervesce strongly with acids, are readily soluble in alcohol, very sparingly in water, and have a faint alkaline reaction. The presence of cinchonine, cinchonidine, and quinidine, singly or collectively, at first increases the formation of precipitate, then decreases and retards it, and if their quantity is higher than a certain proportion, prevents its formation altogether. The details of this method, together with a tabulated statement of the results, are also given; but inasmuch as they cannot be condensed without material detracton from their value, reference must be had to the original paper in *Pharm. Zeitschr. f. Russland*, 1895, or to the reprint in *Pharm. Centralh.*, April 30, 1896, 266–271.

*Quinine Phosphate—Barium Salt an Impurity.*—Alex. Gunn, having occasion to examine a 100 Gm. tin of phosphate of quinine, found that a bright solution in hydrochloric acid turned turbid upon addition of sulphuric acid. A precipitate was thus obtained amounting, it is true, only to 0.13 per cent., but composed of barium sulphate. It is difficult to account for the presence of this impurity.—*Chem. and Drugg.*, April 25, 1896, 578.

*Isovaleryl-Quinine—Preparation and Characters.*—Wendt has patented

the following process for preparing "isovaleryl-quinine," a basic compound which yields with salicylic acid

*Tasteless Isovaleryl-Quinine Salicylate*: 3 parts of quinine (alkaloid) are dried at  $125^{\circ}$  and heated upon a water-bath to complete reaction with 4 parts of isovaleryl chloride. The product of the reaction is dissolved in water by the aid of hydrochloric acid, the solution is supersaturated in the cold with ammonia, and shaken out with benzol, which leaves the quinine-ester on distillation and evaporation to dryness. So obtained, the ester, isovaleryl-quinine, is an amorphous hygroscopic body, which gives the thalleioquin reaction, is easily soluble in excess of acids, alcohol, ether and in benzol. Its neutral salts are sparingly soluble in water, but the acid salts are easily dissolved, and their solutions are fluorescent. On heating with alkalis the ester is saponified. If an ethereal solution of isovaleryl-quinine is mixed with an equivalent quantity of salicylic acid, *isovaleryl-quinine salicylate* is precipitated after a short time and may be crystallized from alcohol in regular scales or by slow spontaneous evaporation in large well-formed tablets. The compound is anhydrous and stable, sparingly soluble in water and ether, tolerably readily in alcohol and in benzol, and melts at  $202^{\circ}$ . It is tasteless, and has the additional advantage, medicinally, of combining the activity of the valeric acid radical with that of quinine.—Pharm. Centralh., Dec. 19, 1895, 730; from "Rundschau."

*Quinethol—Properties, etc.*—C. Grimaux describes the method of preparing quinethol, para-ethoxyquinoline,  $C_{11}H_{11}NO$ , its hydrochlorate, sulphate and nitrate. Quinethol is a weak base, and its salts with the organic acids are dissociated by water. By dissolving quinethol in sulphuric acid and adding two molecules of fuming nitric acid,

*Nitroquinethol*,  $C_{11}H_{10}(NO_2)NO$ , is obtained. This has feeble basic properties. By reducing this nitro compound with stannous chloride in a hydrochloric acid solution at a temperature of  $50^{\circ}$ ,

*Amidoquinethol*,  $C_{11}H_{10}(NH_2)NO$ , is obtained. This is easily diazotized, and yields tinctorial diazo-compounds. Quinethol has no action upon intermittent fever, and has no anti-periodic properties.—Chem. News, Dec. 20, 1895, 306; from Compt. rend., Nov. 25, 1895.

*Aconitine—A Characteristic Reaction Suitable for its Detection.*—Wyndham R. Dunstan and Francis H. Carr, during the course of some experiments conducted in connection with their studies of the oxidation products of aconitine, have noticed a reaction which does not appear to have been observed before, and which is sufficiently distinctive and delicate to be of service in detecting aconitine. This reaction depends on the production of a purple, crystalline, sparingly soluble

*Aconitine Permanganate*, which is precipitated when a solution of an aconitine salt is mixed with a very slight excess of a solution of potassium permanganate. The purple precipitate is fairly stable, especially in the presence of a small quantity of acetic acid. In very dilute solutions the



micro-crystalline precipitate appears after vigorous stirring. The reaction is extremely delicate; a solution containing 1 part of aconitine in 4000 gives a distinct precipitate after standing and stirring, whilst a solution of 1 part of alkaloid in 2000 gives an immediate precipitate. The presence of a slight excess of acetic acid tends to preserve the precipitate from change (darkening), but anything like a large excess must be avoided, because the salt is somewhat soluble in it. Reciprocally the salt is slightly soluble in excess of permanganate. Analysis of the salt leads to the formula  $C_{33}H_{45}NO_{12}, HMnO_4$ . The dried salt gradually decomposes with separation of oxide of manganese and oxidation of the aconitine.

The behavior of the principal alkaloids towards potassium permanganate has been studied by Beckurts, who states that aconitine salts give no precipitate, but a brown coloration. The authors can only suppose that the aconitine used must have been highly impure. They have re-examined the reaction of the most important alkaloids, and have found that the only alkaloids which give a purple precipitate are cocaine, hydrastine, and papaverine, but the permanganates of these are easily distinguished from the aconitine salt. They are all much more soluble, being precipitated only from solutions containing 1 per cent. or more, and only the cocaine permanganate is crystalline, the other two being amorphous. Moreover, these three alkaloids are readily distinguished from aconitine by other reactions. Of other aconite alkaloids, pseudaconitine behaves most like aconitine, but it requires a solution of a strength of not much less than 0.5 per cent. to effect precipitation. Benzaconine also furnishes a precipitate resembling the aconitine permanganate, but a 1 per cent. solution of benzaconine acetate is not precipitated, while aconine salts are not precipitated by potassium permanganate at all.—Pharm. Jour., Feb. 15, 1896, 122-123.

*Aconitine—Estimation on the Basis of the Acetic Acid produced by Hydrolysis.*—Wyndham R. Dunstan and Thomas Tickle have in previous papers called attention to a process for the estimation of aconitine, depending upon the fact that this alkaloid furnishes on hydrolysis 18.5 per cent. of benzoic acid and 9.25 per cent. of acetic acid, or, if the hydrolysis is partial, as is the case when an aconitine salt is heated with water, only acetic acid is separated, a result which also ensues if the aconitine is heated in the dry state at its melting point. They have also shown that there is no difficulty in obtaining accurate results with pure aconitine by analytical processes based on these facts, nor is there any difficulty in estimating the quantity of aconitine in the presence of benzaconine or of aconine. Of four different methods experimented with—one depending on complete hydrolysis of aconitine into benzoic and acetic acids, the other three upon the partial hydrolysis to acetic acid only—these authors have found the following to yield the most accurate and concordant results. It depends on the fact that when aconitine sulphate is heated in a closed tube with water at 125° C. for three hours it undergoes partial

hydrolysis with production of one molecular proportion of acetic acid and the separation of very little benzoic acid. The liquid taken from the tube is made alkaline with pure soda, shaken twice with chloroform to remove alkaloid, then acidified with pure sulphuric acid, shaken once with benzene to remove the small quantity of benzoic acid formed by the hydrolyzation, and is then distilled until the whole of the acetic acid has come over. The distillate is titrated with standard  $\frac{N}{25}$  soda, or better, baryta water, the most suitable indicator being phenolphthalein. In an experiment cited, the result was accurate within  $\pm 0.5$  per cent. The process answers well not only for the estimation of pure aconitine, but also of aconitine mixed with the other known constituents of the total alkaloid of the plant, benzaconine and aconine. But the presence of certain, so far unknown and apparently amorphous, alkaloids in the total alkaloids extracted from the root of *Aconitum napellus*, gives rise to results which are altogether too high, and it is clear that at present the determination of the acetic acid furnished by such total alkaloids cannot be taken as a basis for the calculation of the quantity of aconitine.—Pharm. Jour., Feb. 15, 1896, 121–122.

*Aconine—Addition Products.*—Wyndham R. Dunstan and Francis H. Carr have tried to form benzaconine by introducing a benzoyl group into aconine, and, though they failed in this, they have obtained several new aconine derivatives. The first of these,

*Dibenzaconine*,  $C_{24}H_{37}(Bz)_2NO_{10}$ , is obtained when equimolecular proportions of aconine and benzoic anhydride are dissolved in chloroform and allowed to stand at the ordinary temperature. It is insoluble in water, soluble in ether, and crystallizes from ether in rosettes of needles, melting at  $265^{\circ}$ . The *hydrobromide* crystallizes well from a mixture of alcohol and ether, and melts at  $261^{\circ}$ . The *aurichloride* is precipitated by adding a solution of gold chloride to a solution of dibenzaconine hydrochloride, and may be crystallized in yellow tables from a mixture of alcohol, ether, and petroleum. It melts at  $212^{\circ}$ .

*Tetracetylaconine*,  $C_{24}H_{35}(Ac)_4NO_{10}$ , is formed when a solution of aconine hydrochloride and acetyl chloride in chloroform is allowed to stand thirty-six hours at the ordinary temperature. It is insoluble in water, readily in alcohol or ether, crystallizes in prisms, and melts at  $196^{\circ}$ .—Chem. News, Dec. 6, 1895, 279; from Proc. Chem. Soc., Nov. 7, 1895.

*Septentrionalin—Action Similar to Curare.*—The alkaloid of *Aconitum septentrionale*, which has been recommended as antagonistic to strychnine and to tetanus, is now recommended by Rosendahl as equal to curare and useful in vivisection, being even superior in its anæsthetic action.—Pharm. Centralh., Nov. 14, 1895, 664.

*Atropine—Antagonistic Action of Morphine.*—Prof. Binz records a recent case of accidental poisoning by atropine, in which morphine was successfully used hypodermically as an antidote.—Pharm. Centralh., Dec. 19, 1896, 733; from Berl. klin. Wochenschr., 1895, 997.

*Scopolamine Hydrochloride*—*The Commercial Salt Composed of Two Bases*.—Dr. O. Hesse has ascertained that the substance known in commerce as scopolamine hydrochloride consists of salts of two bases—hyoscyne and atrosyne—which can be separated by crystallization from alcohol, in which they are unequally soluble. Hyoscyne, in combination with hydrobromic acid, turns the plane of polarized light to the left, while atrosyne is inactive, and by means of this difference the relative amounts of the two bases may be ascertained. It seemed possible that atropine might be formed from hyoscyne in the same way that atropine is formed from hyoscyamine, but further investigation has shown that hyoscyne, by the action of caustic soda, is first converted into oscine and lævotropic acid, which soon becomes inactive, and breaks up into water and atropic acid.

*Atrosyne*, on the contrary, appears to break up at once into oscine and atropic acid, without formation of inactive tropic acid. It crystallizes in concentric groups of needles, which melt at  $36^{\circ}\text{C}.$ , and have the composition  $\text{C}_{17}\text{H}_{23}\text{NO}_4 + 2\text{H}_2\text{O}$ .

*Atrosyne Hydrobromide* crystallizes from water, like the hyoscyne salt, in large rhombic plates, but it does not contain water of crystallization, while the hyoscyne salt has three molecules of water. When the two salts are dissolved together in water they crystallize out together, and with three molecules of water.—Pharm. Journ., April 11, 1896, 289.

*Scopolamine Hydrobromide—Evidence of Existence*.—Referring to Dr. Hesse's assertion that commercial scopolamine hydrobromide is a mixture of hyoscyne and its isomer atrosyne, Prof. Ernst Schmidt points out that he has never come across atrosyne in scopol root, and that he has shown by conclusive evidence that hyoscyne is really a mixture of scopolamine and something else. He reviews the work already recorded on the subject. The specific rotation of anhydrous scopolamine hydrobromide is  $25.43^{\circ}$ , but the salts offered as scopolamine hydrobromide on the market differ in this respect and among each other, that of Merck having a specific rotation of  $16.7^{\circ}$  to  $17.9^{\circ}$ , while that of Gehe has a rotation of  $6.49^{\circ}$  to  $6.62^{\circ}$ . The two products, however, could not be distinguished by a crystallographic comparison, and both yielded *scopoline* and atropic acid by hydrolysis with baryta water. Following up this observation, it was discovered that from one and the same root optically active and neutral forms of scopolamine are obtained, and it is to this fact that the different physical properties of the commercial salts are due. What Hesse speaks of as atrosyne is really optically inactive scopolamine. On the other hand, the existence of *hyoscyne* as a distinct body requires further backing. The author also communicates the results of a study by Loboldt of

*Scopoline*,  $\text{C}_8\text{H}_{15}\text{NO}_2$ , the hydrolytic product of scopolamine; the main object of this work being to find if it is identical, as Ladenburg says, with tropine,  $\text{C}_8\text{H}_{15}\text{NO}$ . The results of this investigation show that the two are distinct bodies. Incidentally, a new body,

*Scopologenine*,  $C_7H_{10}O_2.NH$ , has also been separated during the course of these experiments, and has been thoroughly examined and described.—Chem. and Drugg., April 25, 1896, 601; from Apoth. Ztg.

*Lactyltropéine—Preparation and Character.*—The following process for preparing lactyltropéine is given in "Pharm. Centralhalle" (Feb. 6, 1896, 73): 100 parts each of milk sugar and tropine are dissolved in water, about 100 parts of hydrochloric acid, sp. gr. 1.12, are added, and the mixture is heated several days on a water-bath at  $70^\circ$  to  $100^\circ$  C., carefully replacing the vaporized hydrochloric acid from time to time. The product of the reaction is then made alkaline, the new base is shaken out with chloroform and purified in the manner of purifying alkaloids in general. Lactyltropéine— $C_8H_{14}NO,CO,CH(OH).CH_2$ , forms white, concentrically grouped needles, which melt at  $74^\circ$  to  $75^\circ$  C, and are readily soluble in water, alcohol, ether, chloroform, etc. The *hydrochloride* forms colorless crystals, easily soluble in water and alcohol; the *hydroiodide* white, broad needles, easily soluble in water, with difficulty in alcohol; the *nitrate*, white prisms, easily soluble in water and alcohol; and the *sulphate*, colorless, radiating mass of crystals, readily soluble in water.

*Cocaine—Precaution Against Heating.*—Wm. Johnston had occasion to make an ointment of: Creolin, 80 m.; cocaine hydrochlorate, 132 grs.; lanolin, 2 oz. Using a hot mortar instead of hot water for effecting the mixture, the ointment was returned as ineffective, it having been dispensed in efficient condition before. He attributes the change to the overheating of the mortar.—Pharm. Journ., March 28, 1896, 249.

*Cocaine-alum—A New Compound.*—N. A. Orlow has prepared a double salt of aluminum and cocaine sulphate by mixing and evaporating the solutions of the two sulphates, allowing the concentrated solutions to cool and adding a small crystal of potassium alum, when the new compound will crystallize out in splendid octahedral crystals. The author expects that this compound will not alone find application as a medicinal agent, but also that its production may serve as a means of separating cocaine from associated alkaloids.—Pharm. Centralh., Oct. 10, 1895, 584; from Pharm. Zeitschr. f. Russl., 1895, 577.

*Cephaeline and Emetine—Pharmacological Action.*—R. B. Wild, M. D., reports exhaustively upon the relative pharmacological action of cephaeline ( $C_{14}H_{20}NO_2$ ) and emetine ( $C_{15}H_{22}NO_2$ ), the two alkaloidal constituents which have been recently determined by Paul and Cownley in ipecacuanha. The author's experiments were made with the hydrochloride of the alkaloids, supplied for this purpose by Dr. Paul. The effect of

*Cephaeline Hydrochloride*, upon the author and two volunteers, was observed under varying conditions. A dose of 5 Mgm. ( $\frac{1}{12}$  grain) caused nausea, giddiness, salivation, retching, but no actual vomiting, and a slight fall in arterial tension, which attained its maximum in about one hour. A

dose of 10 Mgm. ( $\frac{1}{8}$  grain) produced similar symptoms, and after an hour violent vomiting. In other persons the smaller dose produced similar effects and violent vomiting, but in no instance did vomiting occur in less than forty-five minutes.

*Emetine Hydrochloride* caused in 5 Mgm. doses either no appreciable effect or slight giddiness, nausea, and retching; 15 Mgm. ( $\frac{1}{4}$  grain) produced giddiness, nausea, and retching in twenty-five minutes, and there was an increased flow of the nasal secretion, accompanied by much salivation; vomiting occurred in forty-seven minutes, and after the lapse of two hours the subject had a loose motion of the bowels. On the pulse the drug caused a considerable lowering of arterial tension. There was no effect upon the skin or urine.

The author concludes from these and other observations that cephaeline is the best emetic, acting in doses of  $\frac{1}{12}$  to  $\frac{1}{8}$  grain. Its action is certain, and is comparatively free from depressing effect upon the circulation. Emetine is not so active as an emetic, the dose being  $\frac{1}{4}$  grain. It has a very evident effect upon the nasal secretion, which cephaeline has not, and both of them cause pronounced salivation. The slow action of cephaeline as an emetic, however, precludes its use as an antidote in cases of poisoning.—Pharm. Journ., Nov. 23, 1895, 435-436.

*Alkaloidal Constituents, etc., of Jaborandi.*—In connection with a review of the commercial varieties of jaborandi (which see under "Materia Medica"), E. M. Holmes briefly describes the active principles, and their derivatives, of jaborandi leaves, viz.: pilocarpine, jaborine, pilocarpidine, jaboridine, jaboric acid, and jaborine. See Pharm. Jour., Dec. 28, 1895, 541-542.

*Caffeine—Synthesis from Uric Acid.*—The relation of caffeine to uric acid having been indicated by Rochleder, and to theobromine by Strecker, it was followed by the establishment of the relation of the two bases with xanthine by E. Fischer, since which time theobromine has been represented as dimethyl-xanthine and caffeine as trimethyl-xanthine. But notwithstanding the evident close relation of uric acid to xanthine, all attempts to convert uric acid into that substance have been unsuccessful. Fischer points out that this is due to constitutional differences between these two compounds, which consist not only in the number of oxygen atoms, but also in the situation of the double linkage, and of the hydrogen atoms. In the methyl derivations of uric acid hitherto known, the structure of the carbon chain has remained unaltered, while hydrogen and oxygen have been removed from the alloxan nucleus. Fischer and Ach have now succeeded in replacing both hydrogen atoms of the alloxan nucleus by methyl, and have thus obtained  $\gamma$ -dimethyl uric acid, convertible by means of phosphorus oxychloride and pentachloride into chlortheophylline, which by reduction with hydriodic acid is converted into theophylline, and this, by methylation, yields caffeine. At present, this synthesis does not admit of practi-

cal application, and involves too many operations, but if it should prove possible to methylate uric acid directly, so as to substitute two methyl groups in the alloxan nucleus, the synthetic production of caffeine may become of practical value.—Pharm. Jour., Feb. 1, 1896, 81; from *Berichte*, xxviii., 3135.

*Caffeine—Compounds with Organic Acids.*—As the result of comprehensive experiments, Tanret insists that while caffeine is capable of forming definite compounds with mineral acids, it does not form such with organic acids, though he allows that the latter augment its solubility. But the acid is in no degree neutralized, hence such compounds are unsuitable for hypodermic purposes, particularly since the weight of the free organic acid injected may amount to several times that of the caffeine. He states that the salts of the mineral acids present no advantage for this purpose over caffeine by itself, but that in the presence of benzoate, cinnamate, or salicylate of sodium, caffeine dissolves in but little water and forms double salts very rich in alkaloid (45.8, 58.9, and 61 per cent. respectively). These double salts, being all very freely soluble in water, offer the means of administering caffeine hypodermically without the presence of free acid. They may be prepared extemporaneously by simple solution, as follows, observing that the salts employed are exactly neutral:

*Caffeine-sodium benzoate*: Sodium benzoate, 288; caffeine, 244.

*Caffeine-sodium cinnamate*: Sodium cinnamate, 170; caffeine, 244.

*Caffeine-sodium salicylate*: Sodium salicylate, 160; caffeine, 244.

Pharm. Jour., Sept. 28, 1895, 261; from *L'Union Pharm.* xxxvii., 394.

*Caffeine*.—Percentage and extraction from *Kola Nuts*, which see under “*Materia Medica*.”

*Caffeine*.—Estimation in *Tea*, which see under “*Materia Medica*.”

*Caffeine and Caffetannic Acid*.—Micro-chemical localizations, see *Coffee*, under “*Materia Medica*.”

*Theobromine Periodides—Formation.*—G. E. Shaw remarks that apparently only one theobromine periodide— $C_7H_8N_4O_2 \cdot HI \cdot I_3$ —has heretofore been described. It was prepared by Jörgensen by exposing a solution of theobromine hydrochloride, mixed with potassium iodide, to the air. By varying the amount of hydrochloric and hydriodic acids present, the author has obtained a compound having the formula  $(C_7H_8N_4O_2)_2 \cdot HI \cdot HCl \cdot I_2$ , and another having the formula  $(C_7H_8N_4O_2)_3 \cdot HI \cdot (HCl)_2 \cdot I_3$ . By recrystallizing a mixture of the three compounds from weak alcohol containing hydriodic acid and iodine, a substance of the composition  $(C_7H_8N_4O_2 \cdot HI)_2 + H_2O$  was obtained; whilst a solution of theobromine in saturated hydriodic acid deposited on standing crystals having the composition  $(C_7H_8N_4O_2 \cdot HI)_2 \cdot I_3$ .—Chem. News, Dec. 6, 1895, 278, from Proc. Chem. Soc., Nov. 7, 1895.

*Theobromine Salicylate—Stability and Characters.*—E. Merck (in

Merck's Jahresbericht) describes theobromine salicylate as crystallizing in well-defined needles of definite composition, and as a very stable compound as compared with the double compound of theobromine sodium with sodium salicylate, known as "diuretin," which is decomposed even by carbonic acid and is also objectionable on account of its alkaline taste, rendered more disagreeable by the sweet taste of the salicylic acid.—*Pharm. Jour.*, Feb. 29, 1896, 161.

*Cusparine—Characters and Compounds.*—In a previous paper H. Beckurts has shown that the bark of *Cusparia trifoliata*, Engler (Angostura bark) contains at least four alkaloids, which have been named *cusparine*, *cusparidine*, *galipine* and *galipidine*. These alkaloids exist in the bark for the greater part in a free state, and only in small proportion in saline combination. In the present paper (available to the reporter) the author communicates the results of his investigations concerning cusparine. This alkaloid, when completely freed from tenaciously adhering galipine by repeated crystallizations from petroleum ether-ligroin, is obtained in form of compact warty crystal-aggregations from dilute solutions, or in form of fine, feathery or stellately grouped needles from concentrated solutions. It is easily soluble in alcohol, ether, chloroform, acetone and benzol, forms colorless salts with acids which are sparingly soluble in water, and has the composition  $C_{20}H_{19}NO_3$ . Pure concentrated sulphuric acid dissolves cusparine with an immediate dirty-red color, which soon changes to a cherry-red, similar to that produced under the same conditions by veratrine. Fuming nitric acid dissolves it with a yellow color; Fröhde's reagent at first with a brown, changing to violet, blue-green, and eventually to a deep blue color, the latter being produced at once if the alkaloid is dissolved in concentrated Fröhde's reagent.

*Cusparine Hydrochloride* ( $C_{20}H_{19}NO_3.HCl + 3H_2O$ ) is obtained in sparingly soluble, colorless, bitter, glistening needles, which lose their water of crystallization when heated to  $100^\circ$ .

*Cusparine Hydrobromide* ( $C_{20}H_{19}NO_3.HBr$ ) is obtained in long, colorless needles, which are sparingly soluble in water and in alcohol.

*Cusparine Sulphate* ( $C_{20}H_{19}NO_3)_2.H_2SO_4 + 7H_2O$ ) forms white, prismatic, very bitter, hard needles, which are sparingly soluble in water.

The author has also prepared and describes the following compounds:

Cusparine-dibromide; cusparine-aurochloride; cusparine-platinochloride; cusparine-methyl iodide; cusparine-methyl chloride and its double salts with platinum and with gold; cusparine-methyl-ammonium hydroxide; methyl-cusparine, and its hydrobromide and hydrochloride; methyl-cusparine methyl-iodide; cusparine-ethyl iodide; cusparine-ethyl-chloride, and its platinum double salt; cusparine-ethyl-ammonium-hydroxide, and ethyl-cusparine.—*Arch d. Pharm.*, 233 (1895, No. 6), 410-423.

*Calycanthine—Characters, etc.*—Dr. R. G. Eccles publishes some additional information concerning the alkaloid calycanthine which he dis-

covered in the seeds of *Calycanthus glaucus*, Willd., a number of years ago (see Proceedings 1888, 382), the present observations being mainly confined to some interesting results communicated by Prof. H. W. Wiley, who in 1890 (see Proceedings 1890, 480), also published results of a proximate examination of the seeds. Numerous combustions made by Prof. W. A. Noyes, with the pure alkaloid, lead to the formula  $C_{17}H_{23}N_3O$ . The crystals of the alkaloid obtained from absolute alcohol had a slight amber-tint. Their usual form is that shown by Fig. 70, and is a simple trimetric octahedron. Other forms, however, enter into combination with the octahedron. Fig. 71 shows as a combination the basal plane (100),

FIG. 70.

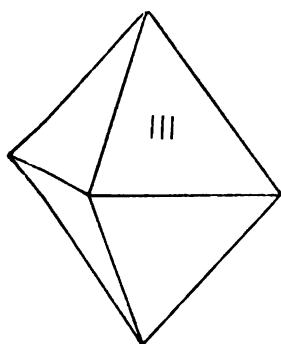
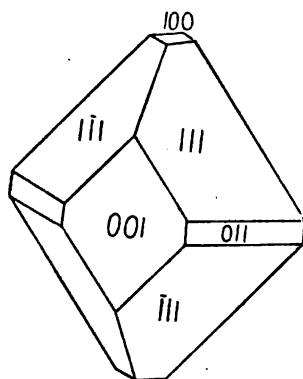


FIG. 71.



macropinacoid (001), vertical dome (011) and the octahedron (111); but among over 100 crystals examined by Dr. W. H. Melville of the Geological Survey, who made the drawings and measurements, no other forms were discovered. No hemihedral or tetartohedral modification exists. The pure alkaloid melts at  $219^{\circ}$  C. to a brownish liquid. The specific gravity in water at  $25^{\circ}$  C. is 1.4555. Its specific rotatory power is most remarkable, being of such an unheard of magnitude (651.75) that it seemed incredible until the mean of a large number of closely agreeing determinations had been made. Quinidine with a specific rotatory power of 230.35 in chloroform is the only alkaloid that approaches toward it. Dr. Eccles mentions that at a recent meeting (in February) of the American Chemical Society, some pure, transparent crystals of calycanthine, the first perfectly colorless ones produced, were exhibited. They look exactly like diamonds, and refract light with all the beauty of the diamond, a property possessed by no other artificially produced crystals and due to the high refractive power mentioned by Prof. Wiley.—Drugg. Circ., March 1896, 55-57.

*Matrine—A Characteristic Alkaloid from Sophora angustifolia.*—Dr. P.



C. Plugge, who has recently determined the presence of cytisine in several species of *Sophora* (see Papilionaceæ, under "Materia Medica") has secured from Professor Nagai of Japan a small quantity of well-crystallized alkaloid, which the latter had isolated from the root of *Sophora angustifolia*, known in Japan by the name matari. Prof. Nagai had named the alkaloid *matrine*. Dr. Plugge, suspecting that this alkaloid might be identical with the cytisine found by himself and others in different plants of the *Papilionaceæ*, subjected the sample to critical examination, and finds the new alkaloid to be distinct from cytisine, and to possess the characteristics that appear to be ascribed to it by Prof. Nagai. He finds it to be readily soluble in water, forming an alkaline solution, which deflects the polarized ray to the right. It possesses the usual alkaloidal reactions, and forms handsome crystalline compounds. Ultimate analysis of the double gold salt leads to the formula  $C_{15}H_{24}N_2O, HAuCl_4$ . It differs from cytisine not alone in its physiological action, but also in that its nitrate is not, like that of cytisine, insoluble or sparingly soluble in absolute alcohol.—Arch. d. Pharm., **233** (1895, No. 6), 441-443.

*Piperovatine—Improved Method of Preparation, etc.*—The method previously used by Wyndham R. Dunstan and Francis H. Carr for extracting piperovatine from *Piperovatum* being exceedingly tedious, the authors have adopted the following, which enables them to extract and crystallize it in the course of a few hours. The drug is percolated with ether; the dark-colored extract is freed from ether and adhering volatile oil, and then extracted with hot dilute alcohol of 13 per cent., from which crystals separate on cooling, which may be recrystallized from 40 per cent. alcohol. The authors have made further experiments on the hydrolysis of piperovatine. A small quantity was heated with water in a sealed tube to  $160^\circ$ , with the result that a volatile base, probably a pyridine derivative, a substance smelling like anisol and giving phenol on treatment with sodium hydroxide, and also an acid, was produced.—Chem. News, Dec. 6, 1895, 278, 279; from Proc. Chem. Soc., Nov. 7, 1895.

*Pellotine—Utility as a Soporific.*—Jolly states that the alkaloid pellotine, obtained from *Anhalonium Williamsi* by Heffter, who assigns to it the formula  $C_{13}H_{19}NO_3$ , is useful as a soporific. Trials made in one of the Berlin hospitals show that when administered in the dose of 6 centigm. it rapidly produces sleep which lasts several hours, and without producing objectionable effects. The hypodermic dose is from 2 to 4 centigm.—Pharm. Jour., June 27, 1896, 502.

*Arecoline Hydrobromide—A Substitute for Physostigmine.*—Lavagne recommends the hydrobromide of arecoline for contracting the pupil of the eye, its advantages being the rapidity of its action and its remarkable contractile effect, which may be easily maintained for a definite period.—Pharm. Centralh., Aug. 1, 1895, 443; from Therap. Monatsch., 1895, 364.

*Cytisine*.—Occurrence in various members of the *Papilionaceæ*, which see under "Materia Medica."

*Coniine*.—*Occurrence in Sambucus Nigra*.—According to G. de Sanctis, coniine is a constituent of *sambucus nigra*. He has been able to make distinct determinations of this alkaloid in the sulphuric acid extraction of the leaves and stems of the plant.—Pharm. Centralh., Aug. 1, 1895, 436; from Atti de R. Acc., through Ber. d. Ch. Ges., 1895.

*Cornutine Citrate*.—*Remedial Advantages*.—Leuitzki recommends citrate of cornutine as the best remedy for contracting the uterus and in spermatorrhœa. The salt is obtained from ergot in form of a brown powder, readily soluble in water, and is prescribed as follows: Cornutini citras, 0.15; kaolini, 7.0; gum. tragac, 9.0 ad. pil. No. 50. One pill to be taken twice daily.—Pharm. Centralh., April 23, 1896, 259.

*Lantanine*.—An alkaloid from *Lantana* (Verbenaceæ), which see under "Materia Medica."

*Amines—Study of the Addition Compounds with Halogen Substitution Hydrocarbons*.—In the course of an inquiry into certain limits to the formation of the addition compounds of the amines with halogen substitution hydrocarbons by R. F. Flintermann and A. B. Prescott, the compound

*Dipyridine Trimethylamine Dibromide* was obtained. The authors now record the results of their study of certain additive reactions of organic bases, the bases chiefly considered being the tertiary amines, and the halogen compounds chiefly those of mono- and di-halogen substitution, especially in the saturated hydrocarbons. As these results now stand, it appears:

1. That *pyridine* is more reactive for addition with diprimary halogen groups than is *trimethylamine*.
2. That with the weaker base the one primary halogen group protects the others from addition when both these groups link together, not when they are separated by a  $\text{CH}_2$  group.

The authors have studied the reaction of pyridine upon a few primary and secondary dihalogen substituted hydrocarbons, and have not obtained addition in any of these cases. Propylene bromide,  $\text{CH}_3\text{CHBrCH}_2\text{Br}$ , was treated in several operations, both with di-pyridine proportions and with mono-pyridine proportions, with the result of various products, but without an addition product. With ethylidene chloride, also, no addition was obtained.—Journ. Amer. Chem. Soc., xvii., No. 12, Jan., 1896; from Reprint.

*Methylamines—Distinction by Nessler's Reagent*.—According to Delépine, Nessler's reagent gives with dimethylamine and trimethylamine a white precipitate which appears on the addition of water; but with monomethylamine a light yellow precipitate is produced, which redissolves neither in excess of water nor in excess of reagent, and affords a very

sensitive reaction. Sulphuric acid dissolves this precipitate by the aid of heat, but on dilution it reappears if the heat has not been too prolonged. The precipitate blackens easily on exposure to light.—Chem. News, June 26, 1896, 305; from Compt. rend., June 1, 1896.

*Ethylamine—Preparation from Ammonium Aldehydate.*—Ferdinand Jean prepares ethylamine from ammonium aldehydate, freshly prepared, as follows: 10 grams are put into a flask, along with a little water and 20 grams of zinc powder; in ten minutes, 150 grams of hydrochloric acid (1:2) is added, and after ten minutes more, 20 grams of concentrated hydrochloric acid, moderating the reaction by cooling the flask. After forty-five minutes the flask is heated on a water-bath for half an hour, after which the ethylamine is obtained by adding a large excess of soda to dissolve the zinc salt, and passing a violent current of steam through the flask whilst heat is still applied.—Chem. News, Oct. 11, 1895, 185; from Bull. Soc. Chim. de Paris, No. 9, 1895.

*Piperazine—Poisonous Effect.*—Charles Slaughter, M. D., reports the case of a woman suffering from uric acid diathesis, who, by mistake, took 20 grains of piperazine at one dose. In the course of a few hours toxic symptoms developed. The patient was greatly cyanosed and semi comatose. Her pupils were contracted, pulse 50, temperature 97.4, respiration depressed. While sensation was preserved, there was complete loss of motion in the lower extremities. Under careful treatment the patient gradually recovered.—West. Drugg., May, 1896, 202; from Med. News.

*Hydrazine—Successful Production in the Free State.*—Hydrazine, which hitherto has been known only in the state of hydrate,  $N_2H_6O$ , has now been obtained by L. de Bruyn in the free state,  $N_2H_4$ , by decomposition of the hydrochloride with sodium methylate dissolved in methyl alcohol. It may also be obtained by heating the hydrate with baryta to  $100^\circ C.$ , and distilling under reduced pressure. Hydrazine is a liquid boiling at  $113.5^\circ C.$ , without decomposition, solidifying when cooled below  $0^\circ C.$ , and then melting again at  $1.4^\circ C.$  It is a stable body, and can be heated to above  $300^\circ C.$  without decomposition, but must not be exposed to the air, since it oxidizes at the ordinary temperature with elimination of nitrogen. It reacts violently with the halogens, and with solid sulphur it forms sulphuretted hydrogen.—Pharm. Jour., Feb. 29, 1896, 163; from Berichte, xxviii., 3085.

*Hydrazine Hydrate—Derivatives.*—Curtius and Heydenreich state that when hydrazine hydrate reacts with urea at  $100^\circ C.$ ,

*Hydracide Carbamic Acid* is formed. If hydrazine hydrate is heated at  $100^\circ C.$  with carbonic ester,

*Carbohydrazide* is formed, a substance which melts at  $152^\circ C.$ , is soluble in water with feeble alkaline reaction, and forms salts with two equivalents of acid. By treating the hydrochloride of carbohydrazide in a water solution with two molecular proportions of sodium nitrite, the

*Azide of Carbonic Acid*,  $\text{CO.N}_3.\text{N}_3$ , is formed, a colorless oil, which explodes violently when touched with a glass rod. This compound is readily soluble in water, alcohol or ether. It may be regarded as nitrogen carboxide and related to chlor-carboxide,  $\text{COCl}_2$ , as hydrazotic acid is related to hydrochloric acid. When the oily product is shaken out with ether, and the solution evaporated, the carbazide remains in the form of spiky crystals, having a stupefying smell analagous to sulphuretted hydrogen.—Ibid.; from Journ. Prakt. Chem., 52, 433.

*Acetanilid—Qualitative Examination.*—Charles Platt has determined some reactions of pure acetanilid, which, in view of the deficiency in the analytical literature of acid anilids, may prove useful. Acetanilid is white, crystalline, neutral and tasteless. Its melting point, given at  $113^\circ$  to  $114^\circ$ , is fairly constant at  $112^\circ$  in the author's experience. It volatilizes completely when heated on platinum, and burns completely with a yellow flame when ignited. It is soluble at  $15^\circ$  in about 130 parts of water, and and in 5 parts of alcohol, in 18 parts of boiling water and  $\frac{5}{10}$  part of boiling alcohol, and is soluble in cold ether, chloroform, acetic acid, nitric and sulphuric acid, and, when warmed, in hydrochloric acid.

Acetanilid is easily dissolved in cold *strong nitric acid*; the solution is at first colorless, but gradually acquires a green tint, finally changing through yellow to red, and depositing red acicular crystals. The colorless solution on gentle warming turns yellow, then brownish red, and evolves nitrogen oxides. It dissolves slowly in cold *dilute nitric acid*, without change in color, but on evaporation gives a brown residue with slight purplish tint. By boiling the solution remains colorless, but pungent fumes are evolved. With *concentrated sulphuric acid* a colorless solution of acetanilid is produced, which does not change on boiling, but acquires a pink or brown color on long standing. This sulphuric acid solution is turned to dark green on addition of *potassium chromate*, but if the solution is first diluted, it gives no reaction at once, turning, however, reddish brown, and finally dark olive green on standing. With *hydrochloric acid*, under warming, a solution is produced which is not precipitated on dilution. On addition of *potassium permanganate* an olive green, changing on standing to mahogany-brown, is produced in the hydrochloric solution; *bromine* produces a heavy yellow precipitate of the monobrom derivative of aniline, *chlorine* gives a dark blue coloration, which afterwards fades, and *mercuric chloride* produces no reaction. The addition of a little 5 per cent. *phenol* solution, followed by solution of *chlorinated soda* or *lime*, to the hydrochloric solution of acetanilid, produces a brownish red color, turning to a blue on addition of *ammonium hydroxide*. On heating acetanilid with *potassium hydroxide* the characteristic odor of aniline is developed, and if the heating is done with the addition of a few drops of chloroform the characteristic odor of isonitrile, due to the formation of phenyl isocyanide, is developed. A mixture of acetanilid and *sodium nitrate* sprinkled upon concentrated

sulphuric acid produces a fine red coloration. Its cold aqueous solution gives no reaction with *ferric chloride*.—Amer. Drugg., Feb. 25, 1896, 122-123; from Jour. Amer. Chem. Soc.

*Antifebrin, Phenacetin, Antipyrine—Distinction by heating with Zinc Chloride.*—It is stated that the three substances named under this caption may be distinguished by heating them in a test-tube with zinc chloride. *Antifebrin* produces vapors of an aromatic odor; *phenacetin*, the odor of acetic acid; *antipyrine*, an odor resembling carbon disulphide.—Pharm. Centralh., Nov. 14, 1895, 665; from Rép. de Pharm., 1895, 407.

*Antipyrine—New Compounds with Phenols.*—G. Patein and E. Dufau describe the products of the combination of antipyrine with the isomeric diphenols—pyrocatechin, resorcin, and hydroquinone.

*Pyrocatechin-diantipyrine* forms colorless crystals, which are slightly soluble in cold water or in ether, more soluble in boiling water, very soluble in alcohol or chloroform, melt at  $78^{\circ}$ – $79^{\circ}$ , and produce a greenish coloration with ferric chloride.

*Resorcin-monoantipyrine* occurs in colorless needles, which are soluble in 50 parts of cold water, very soluble in boiling water, alcohol, or chloroform, only slightly soluble in ether, melt at  $103^{\circ}$ – $104^{\circ}$ , and give a blood-red coloration with ferric chloride.

*Hydroquinone-diantipyrine* also forms colorless needles, the solubility of which is very similar to that of the resorcin compound; but its solution in chloroform is accompanied by decomposition, its melting point is  $127^{\circ}$ – $128^{\circ}$ , and the dark red color produced by ferric chloride quickly becomes lighter in color.—Pharm. Journ., Nov. 2, 1895, 366; from Compt. rend. cxxi., 463.

*Antipyrine-Salol—A New Hemostatic and Antiseptic.*—Professor Labadie-Lagrave recommends a compound of antipyrine and salol as an efficient hæmostatic and antiseptic (in the treatment of uterine hæmorrhages? Rep). Equal parts of the two substances are placed in a test tube so as to fill it about one-third, and heated until the light brown color at first developed gives place to a seal brown. The resultant liquid, which congeals very slowly, is applied by saturating a tuft of cotton with it, allowing it to cool sufficiently, and then introducing it to the parts by the aid of a speculum.—Pharm. Centralh., Oct. 10, 1895, 585; from Med. Bull., 1895, 297.

*Formopyrine—A New Synthetic Compound.*—By the action of 40 per cent. formaldehyde solution upon a solution of antipyrine, a new crystalline compound is obtained which has been named "formopyrine." It melts at  $142^{\circ}$ , is insoluble in cold water and in ether, but dissolves in hot water, alcohol, chloroform, and in acid. It forms monobasic salts, the hydrochloride, sulphate, phosphate, and oxalate having been prepared.—Pharm. Centralh., June 18, 1896, 382.

*Acetamidoantipyrine—Preparation.*—It is stated in "Pharm. Centralh." (Sept. 5, 1895, 510) that "acetamidoantipyrine," a yellow crystalline body, melting at 109°, and soluble in water and alcohol, is produced as follows: By the action of nitric acid upon antipyrine it is converted into nitroantipyrine; this, by reduction with zinc and acetic acid, is converted into amidoantipyrine; and by treating this with a mixture of sodium acetate and acetic anhydride, acetoamidoantipyrine is produced. The new compound is recommended as an antipyretic.

*Aniline Colors—Official Designation of Innocuous Kinds.*—The Austrian Supreme Sanitary Council permits the use of certain coal tar colors for coloring confections, liqueurs, etc., on the ground that they are innocuous, but provides that the manufacturers must have their products examined at least once a year, and that the consumer (confectioner, etc.) must purchase them in the original package of the manufacturer. These colors are the following: Fuchsine; acid fuchsine; roccellin; Bordeaux; ponceau; eosin; erythrosin; phloxin. Alizarin blue; aniline blue; water blue; indulin. Acid yellow R.; tropæolin ooo (orange I.). Methyl violet. Malachite green, and all greens that are produced by mixture of the above named blue and yellow coloring substances.

The packages containing these colors must bear the statement on the label that they can be used for coloring food products, and must give the date on which a sample of the identical product has been examined.—Pharm. Centralh., May 14, 1896, 302.

*Aniline Colors—Solubilities.*—The following convenient table, showing the amount of each aniline color soluble in 1000 parts of the solvent at 60° F., is given in "National Drugg." (Feb., 1896, 48):

	Water.	Alcohol.		Water.	Alcohol.
Aurin .....	almost insoluble.	400.	Magenta red .....	2.	25.
Bismarck brown .....	30.	3.5	Malachite green .....	40.	50.
Corallin .....	20.	5.	Manchester yellow .....	20.	1.5
Dahl blue .....	40.	10.	Methyl blue .....	30.	15.
Eosin .....	20.	10.	Methyl green .....	70.	2.5
Ethyl orange .....	0.2	almost insoluble.	Methyl violet .....	20.	1.5
Fuchsine .....	3.	100.	Safranin .....	6.	4.
Gentian violet .....	15.	30.	Tropæolin .....	0.5	1.
Luteolin .....	2.5	6.	Vesuvin .....	20.	2.

*Fuchsine and Fuchsine S.—Differences in their behavior toward Aldehydes.*—Cazeneuve shows that fuchsine and fuchsine S. behave in a different manner in presence of alcohol containing aldehydes. If a few cubic centimeters of an aqueous solution of a salt of rosaniline (1:1000) be decolorized by means of sulphurous acid, a violet coloration is produced on

adding alcohol containing formic or ethylic aldehyde, but in the case of the acid fuchsine S., under similar conditions, a rose tint like that of the original solution diluted, is produced. The addition of hydrochloric acid does not modify the result in the latter case, but intensifies the coloration produced by the salts of ordinary rosaniline.—Pharm. Journ., June 27, 1896, 502; from Journ. de Pharm. (6) iii., 595.

*Luteol—Value as an Alkalimetric Indicator.*—W. Autenrieth, following the modern practice of giving special names to definite chemical compounds, describes

*Oxychlor-diphenylquinoxalin*, under the name "luteol," as possessing certain advantages over phenolphthalein and litmus. Luteol occurs in fine, woolly, yellowish needles, melting at  $246^{\circ}$ , insoluble in water, sparingly soluble in cold alcohol, but readily dissolved by hot alcohol and by ether. It is also insoluble in dilute hydrochloric, only sparingly soluble in the concentrated acid, but forms a red solution in concentrated sulphuric acid, from which it is re-precipitated on addition of water. It expels carbonic acid from carbonates, and is readily dissolved by alkalies, forming yellow solutions. A distinct yellow color appears on adding a few drops of an alcoholic solution of luteol to 5–10 Cc. of a solution obtained by the addition of a drop of dilute soda-lye to one liter of water, and it is therefore decidedly more sensitive than either phenolphthalein or litmus. Another advantage of luteol over phenolphthalein is that it is applicable in the presence of ammonia, whilst as compared to litmus there is no intermediate color produced during the change.—Pharm. Journ., Febr. 29, 1896, 163; from Zeit. Anal. Chem. xxxv, 68.

#### GLUCOSIDES AND NEUTRAL PRINCIPLES.

*Digitalinum Verum—Difficult Crystallization.*—H. Kiliani communicates some experiments made with the view to obtaining *digitalinum verum*, in handsome crystalline condition instead of the granular condition in which it is predisposed to separate from its solvents. He finds that if the crystallization is allowed to take place slowly at a comparatively high temperature, very handsome needle-shaped crystals can be obtained. The best solvent for this purpose is 85 per cent. methyl alcohol, 1 p. of the glucoside being dissolved at the boiling point in 2 p. of alcohol in a flask provided with a reflux condenser, and, after complete solution is effected, maintaining the solution for several hours at  $45^{\circ}$  C. The method, however, has no practical value, because only about  $\frac{1}{3}$  of the substance is obtainable in crystals in this way, and these become contaminated with the granular form as further crystallization occurs. Moreover, the crystals soon absorb alcohol from the mother liquor in which they have formed and again assume the "granular" form. For the present the author therefore retains the method of purification by alcoholic solution.—Arch. d. Pharm., 1895 (233), No. 9, 698–699.

*Digitalinum Verum—Non-Existence in Digitalis Leaves.*—Physiological experiments made by Professor Boehm with *digitalinum verum* prepared by Kiliani from the crude mixture of glucosides obtained from foxglove seeds have proved this principle to be the only one so far obtained from digitalis that produces the typical action upon the heart without any harmful secondary effects. It is claimed, however, based upon clinical observations, that notwithstanding the apparent advantages of *digitalinum verum*, it fails to produce the beneficial results of an infusion of digitalis leaves, and this has induced Professors Boehm and Kiliani to make some further investigations concerning the constituents of the leaves. The results of these investigations have so far revealed some remarkable distinctions between the constituents of the two digitalis organs. The leaves do not contain *digitalinum verum* such as described by Kiliani as having been obtained from the seeds, but appear to contain instead a substance which is either identical with the digitoxin of Schmiedeberg, or closely related to it. Kiliani, therefore, proposes for it provisionally the name of

*β-Digitoxin.* It is present to the amount of 0.1 per cent., is a glucoside, and was obtained in a crystalline state. The constituents of the seeds and leaves also differ in other respects. While digitonin is an abundant constituent of the seed, it has not yet been determined in the leaves.—Arch. d. Phar., 1895 (No. 4), 311-320.

*Digitalinum Verum—Simplified Method of Preparation.*—By previous investigations, H. Kiliani has demonstrated that the so-called *digitalinum pur.* prepared from foxglove seed by E. Merck, of Darmstadt, contains only a small percentage of the true active constituent, which is identical with Schmiedeberg's digitalin, and to which Kiliani has given the name *digitalinum verum*; and he has also shown that the principal constituent of Merck's preparation is the comparatively inert substance, *digitonin*, also a glucoside and a definite crystallizable compound. His present investigations were made with the object of finding a simple and reliable method for the preparation of true digitalin, his intention being to prepare this directly from the seed or leaves; but he has found it more practicable to employ as his raw material the material met with in trade and readily obtainable under the name of *digitalinum pur.* He finds that this contains not to exceed 5.5 per cent. of true digitalin (*digitalinum verum*), which is the essential ingredient of this crude mixture of digitalis glucosides, and the only one of importance from its action on the heart. It is associated with the crystallizable glucoside digitonin, which composes at least one-half of the crude material. The latter also contains a small percentage of a finely crystallizable organic compound containing calcium and potassium, the remainder being a smeary, absolutely amorphous body, which while requiring further investigation concerning its chemical nature, is shown to be inert or non-toxic by physiological experiments made by Professor Boehm.



The presence of this, amorphous body in the commercial digitalin is in so far important, however, that it renders this crude mixture of glucosides soluble in water, for both *digitalinum verum* and *digitonin* are very sparingly soluble in water when in a state of purity. It is important, therefore, that this amorphous substance be first removed, so that a separation of the crystallizable constituents may become possible. Without going into details, this, and the eventual preparation of *digitalinum verum*, is accomplished as follows: Commercial digitalin (*digitalinum pur.* from seed) is dissolved in four times its weight of 95 per cent. alcohol aided by slight warming. After cooling, the solution is gradually mixed with five parts of ether, sp. gr. 0.720, and the whole is left at rest in a closed vessel for twenty-four hours. The liquid is then decanted from the crystalline digitonin and amorphous body, and, after weighing, the amount of dry substance is ascertained in a small portion of it. The ether is then distilled off, together with the greater part of the alcohol, until the residue is equal to 1.6 times the weight of the dry substance ascertained to have been in the solution, and the total weight is then brought with water to 4 times that of the ascertained dry substance—this making a solvent of 20 per cent. alcohol, from which the digitalin separates under the most favorable conditions. The mixture is now left to stand for twenty-four hours, carefully guarding against evaporation during that time; the separated digitalin is then collected by means of a suction apparatus, drained, then washed, first with 10 per cent. alcohol and afterwards with water, and lastly dried upon porous tiles *in vacuo*. The dry product is then further purified by recrystallization from 95 per cent. alcohol—which is now very easily accomplished—and if necessary by the use of animal charcoal. A further simplification of the process, contemplating the direct preparation from fox-glove seed, appears to be quite practicable. The author suggests that a suitably prepared extract of the seeds be precipitated by tannin, the washed precipitate mixed with lead oxide, dried, and extracted with alcohol; the dry contents having been ascertained, the liquid is reduced by distillation to five parts for each one part of dry substance found, and then treated with ether, etc., as in the above described process.—Arch. d. Pharm., No. 4, 1895, 299-310.

*Amygdalin—Action of Yeast.*—E. Fischer has observed that by the action of yeast enzyme upon amygdalin one-half of its sugar is separated in the form of glucose without any alteration of the nitrogenized group of the molecule, a new glucoside similar to amygdalin being formed, which the author has named

*Amygdonitril-glucoside.*—It has the composition  $C_{14}H_{17}NO_6$ , is readily soluble in water, alcohol, or acetone, and under the influence of emulsin yields the same product as amygdalin, but in different proportions. The author infers that amygdalin is a derivative of maltose or a similarly constituted diglucose, and not as Hugo Schiff suggested, a compound of a disaccharide.—Pharm. Journ., July 27, 1895, 73; from Berichte, 28, 1508.

*Asparagin—Formation and Assimilation.*—According to the researches of O. Loew asparagin is produced very often as the result of the splitting up of proteids, carbon dioxide being given off at the same time. In many other cases, however, as in the sugar of the ripe beet-root, asparagin is a synthetic product; it may, moreover, be formed out of ammonia or nitric acid, and this takes place in barley and maize. Sugar or some substitute for sugar is indispensable for the transformation of asparagin into proteids, and this process may take place in the dark. The sugar need not be formed in the same cells as the asparagin.—Pharm. Journ., May 30, 1896, 421; from Bot. Centralbl. 1896, 302.

*Aloin—Variable Characters of the Commercial Sorts.*—Chas. H. La-Wall, engaged in the examination of a commercial sample of aloin on the lines of the requirements of the Pharmacopœia, was led to consult various authorities for confirmation of certain ascribed properties. Instead of enlightenment upon the subject, confusion seemed to attend every inquiry into its physical character. This was especially so in respect to solubility, almost every author assigning a different degree of solubility to each of the several varieties of aloin, and a few of them were actually verified upon examination of a number of samples from reputable manufacturers. The author, after giving in brief review the history of and characters attributed to the aloins by different authors, communicates the results of his experiments upon four commercial samples in some detail, and in the form of a table as follows:

	Solu- ble in Water.	Solu- ble in Alco- hol.	Solu- ble in Ether.	Melt- ing Point ° C.	Ash per cent.	Color.	Microscopic Appearance.
1 .....	1-100	1-40	1-800	90°	0.50	Dark brownish yellow.	Distinct crystals and crystal masses.
2 .....	1-70	1-30	1-2500	118°	0.34	Light yellow.	Crystalline powder.
3 .....	1-80	1-35	1-2000	115°	0.04	Light yellow.	Same as No. 2.
4 .....	1-95	1-20	1-1170	100°	0.60	Brownish yellow.	Same as No. 1.

Reference to this table will show that a distinct ratio exists between the solubility in water and in ether: the greater the solubility in the water, the less the solubility in ether. The presence of a small amount of resin would partially account for this difference, and it is extremely probable that strictly pure aloin is soluble to a less extent in ether than any of the figures given; indeed, in the case of a sample made by the author, the solubility in ether was found to be 1-16,000 parts, but further experiments are being made in the hope of throwing some definite light upon this subject.—Proc. Pennsylvania Phar. Assoc., 1895, 92-96.

*Artemisin—Characters, etc.*—According to Merck the mother liquors in the manufacture of santonin from the seeds of

*Artemisia maritima*, yield a crystalline principle,  $C_{15}H_{18}O_4$ , which has been named "artemisin." It is freed from santonin by recrystallization from chloroform, being deposited combined with one molecule of the solvent which is evolved at  $90^\circ$ . It melts at  $200^\circ$ , gradually turns yellow in the air, and is more readily soluble in water and in dilute alcohol than santonin. It gives a fugitive carmine red color when heated with aqueous or alcoholic soda, and is apparently a hydroxy-santonin.—Pharm. Journ., June 20, 1896, 484; from J. Ch. Soc., after Chem. Centr.

*Carissin—A New Glucoside.*—J. H. Maiden and H. G. Smith have isolated a new glucoside from the bark of *Carissa ovata*, R. Br., var. *stolonifera*, which they have provisionally named "carissin." It is exceedingly and persistently bitter, and very poisonous, causing nausea and headache. The purified glucoside is totally insoluble in petroleum spirit, ether, or chloroform; slightly soluble in absolute alcohol in the cold, much more on boiling; readily dissolved by dilute alcohol and by hot water, but not readily soluble in cold water. It was obtained as an amorphous, slightly deliquescent mass; is readily decomposed by all acids, and somewhat resembles strophanthus, differing from that glucoside by being precipitated by basic lead acetate and by tannic acid. Its most characteristic reaction is a beautiful emerald green color produced when a portion of the dry substance is dissolved in concentrated sulphuric acid, and a minute fragment of potassium dichromate added.—Pharm. Jour., Feb. 1, 1896, 83, 84.

*Vanillin—Different Artificial Methods of Production.*—Dr. J. Altschul gives an interesting description of the different synthetic processes that are used in the production of vanillin. These methods are tabulated by him as follows:

(1) By the oxidation of an aliphatic side-group, vanillin may be produced from:

a. Coniferin; glucovanillin; olivil: acet-homo-vanillic acid; acet-ferulic acid.

b. Eugenol; iso-eugenol; acet-eugenol; eugenol-acetic acid; acet-iso-eugenol; benzyl-iso-eugenol; methylene-iso-eugenol; iso-eugenol-phenyl-acetic acid; iso-eugenol-toluylic acid.

(2) By conversion into p-nitro-m-methyloxy-benzaldehyde, vanillin may be produced from:

Toluol (as p-nitro-m-chlor toluol); cinnamic acid (as m-methyloxy-cinnamic acid ester); benzaldehyde (as m-amido benzaldehyde).

(3) By the introduction of a methyl-group into proto catechuic aldehyde, vanillin may be formed from:

The bimetallic salts, the monoacetyl compounds, the benzyl-compounds, and the benzol-sulpho compounds of proto-catechuic aldehyde.

(4) From guaiacol vanillin may be produced:

a. by the introduction of an aldehyde group by treatment with chloroform and potassium hydrate solution.

b. by conversion into guaiacol carbonic acid, introduction of the aldehyde group, and splitting off of the carboxyl group.

c. by conversion into guaiacol dicarbonic acid, treatment with chloroform and potassium hydrate solution, and splitting off of the ortho-carboxyl group.

The author observes that it is difficult to arrive at a satisfactory opinion respecting the practical value and application of these numerous methods, since the difficulties encountered in the manufacture of vanillin are naturally not made public. From information received through reliable sources, however, it appears evident that the only manufacturing firm whose product is at present represented in the German market is one that employs the process of preparing vanillin directly or indirectly from coniferin.—Pharm. Centralh., Dec. 19, 1895, 721-727.

*Acokantherin*, the active constituent of the wood of *Acokanthera Shimperti*, Benth. and Hook, which see under "Materia Medica."

*Kolanin*.—Liability to split up and precaution to be observed to extract it in its normal condition from *Kola*, which see under "Materia Medica."

*Polygonin*.—An emodin-yielding glucoside from *Polygonum cuspidatum*, which see under "Materia Medica."

*Colombin and Colombic Acid*—*Preparation and Characters*.—See *Colombo* under "Materia Medica."

*Daphnin*.—Localization in *Daphne alpina* and *Daphne gnidium*, which see under "Materia Medica."

#### COLORING MATTERS.

*Litmus*—*Assay of Commercial Samples*.—D. Rainy Brown has subjected nine commercial samples of litmus to assay, with particular reference to the

*Azolitmin*, or, at all events, the coloring matter of litmus upon which its value depends. The substance which he has separated and considers as "azolitmin" is quite soluble in water, but insoluble in alcohol. It cannot, therefore, be the same substance as that described by De Luynes as azolitmin, which is stated to be soluble in alcohol, and nearly insoluble in water. The other coloring matters of litmus—spaniolitmin, erythrolein and erythrolitmin, being of no value, have not been considered in the author's investigation. The method of estimating the azolitmin consisted in exhausting the finely powdered sample with boiling water so long as any coloring matter was extracted, evaporating the water extract to a small bulk, acidifying with acetic acid, and evaporating to near dryness. A large excess of 85 per cent. alcohol is added, which precipitates the crude azolitmin; this, after standing twelve hours, is collected on a filter, and when dry washed with the smallest possible quantity of boiling water into

alcohol. The pure azolitmin which is thus precipitated is filtered off, dried and weighed. In order to check the results the samples were re-assayed by a slightly different method, which does not, however, differ in its essentials from the original method. The results are given in the following table :

Sample.	Per cent. Moisture.	Per cent. Insoluble in Boiling Water.	Per cent. Azolitmin.	
			First Assay.	Second Assay.
1.....	2.8	84.3	5.21	5.09
2.....	4.0	73.6	5.84	5.83
3.....	2.0	83.3	4.92	5.02
4.....	1.2	89.8	3.40	3.30
5.....	6.4	60.0	13.55	13.10
6.....	1.6	87.9	4.79	4.75
7.....	2.0	85.4	4.31	4.46
8.....	1.8	89.6	3.82	3.70
9.....	10.1	46.0	14.22	13.98

The average amount of azolitmin in seven of the samples, 4.6 per cent., is higher than that obtained by Mitchell (1876), who found 2.2 per cent. The samples Nos. 5 and 9, however, contrast strongly with all the others. They both indicate a high percentage of moisture and of azolitmin, and a low percentage of insoluble matter, a quality which is also borne out by their appearance, and it is evident that the process of their preparation must have been different and superior to that employed for the preparation of the other samples. It must be mentioned that the author's azolitmin agrees in its characters with that described by Kane in 1840, and by Wartha in 1876 (see Proceedings 1876, 383). The author points out some objections to the B. P. process for preparing litmus solution, and suggests its preparation from pure azolitmin obtained as described above.—Pharm. Jour., March 7, 1896, 181.

*Cachou de Laval—A Remarkable Dye Stuff from Various Organic Substances.*—F. W. Richardson and H. E. Aykroyd have examined this remarkable dye stuff, known for some years, and obtained by fusing organic substances, such as starch, cellulose, saw-dust, blood, horn, feathers, etc., with alkaline sulphides, sodium polysulphide being preferred. It was believed by the inventor to constitute an organic sulphide, and occurs in black, porous and hygroscopic lumps, quickly alterable on exposure to air, and readily dissolving in water, with formation of a black solution which develops brownish colors by aerial oxidation. By using with it salt, sodium bisulphite, potassium dichromate, or copper and iron sulphates, shades of color varying from pale grey to brownish-black may be obtained. The authors have now separated from the "cachou" the pure dye-stuff as a

black powder, insoluble in water, alcohol, ether and acids, but soluble in hot solutions of caustic soda or potash. Experiments proved that both furfural and thiophene will yield the dye when heated with sodium polysulphide, and the authors therefore term the dye principle

*Trithiophenic Acid*.—They also direct attention to the fact that the reaction ensuing when polysulphides are fused with organic bodies serves as a distinctive test for tetramethenyl and other "cachou" forming groups in compounds.—Pharm. Jour., June 27, 1896, 502; from Jour. Soc. Chem. Ind., xv., 328.

*Luteolin—Compounds with Acids, etc.*—Arthur G. Perkin has studied the behavior of acids upon luteolin, the yellow coloring matter of the dye-stuff "weld," which is the dried herbaceous plant known as *Reseda luteola*. This coloring matter was originally isolated from weld by Chevreul, but subsequently was studied by Moldenhauer, by Schützenberger and Paraf, by Rochleder, and by Hlasiwetz and Pfaundler. Various formulas have been assigned to the substance, but that given by the latter chemists— $C_{15}H_{10}O_6$ —is confirmed by the present experiments. By the action of nitric acid upon luteolin, Rochleder had obtained oxalic acid. Mr. Perkin obtained

*Luteolin sulphate*,  $C_{15}H_{10}O_6H_2SO_4$ , by adding sulphuric acid to a saturated solution of luteolin in boiling acetic acid. On cooling, the orange colored liquid deposited crystals, which were collected, washed with acetic acid, and dried. The compound consists of orange red needles, insoluble in acetic acid, and decomposed by water quantitatively into luteolin and sulphuric acid. In similar manner, using hydrobromic in place of sulphuric acid,

*Luteolin Hydrobromide*,  $C_{15}H_{10}O_6HBrH_2O$ , was obtained in form of an ochre-colored mass of fine needles, which, by contact with water, are somewhat slowly decomposed into luteolin and hydrobromic acid.

*Luteolin Hydrochloride*,  $C_{15}H_{10}O_6HClH_2O$ , resembles the hydrobromide closely, while

*Luteolin Hydriodide*, which was not analyzed, but crystallizes beautifully in orange-colored glistening prisms.

The author, furthermore, has prepared

*Luteolin Hydriodide*, which was not analyzed, but crystallizes beautifully in orange-colored glistening prisms.

The compounds of luteolin with the haloid acids are peculiar in that they appear to crystallize with 1 mol.  $H_2O$ , and differ in this respect from the corresponding compounds of quercetrin, fisetin, and morin, which do not contain water of crystallization. In order to leave not the slightest doubt as to the molecular weight of luteolin, the author has prepared a number of derivatives—*Dibromoluteolin*, *Tetracetyluteolin*, *Dibromotetracetyluteolin*, and *Tetrabenzoylluteolin*, the analyses of which confirm the formula

$C_{15}H_{10}O_6$ . The action of fused alkali upon luteolin was also studied, but the results were not conclusive because of the limited quantity of material. In conclusion, the author calls attention to the close similarity in properties of luteolin to those of *fisetin*— $C_{18}H_{10}O_6$ —the coloring matter of "Young Fustic" (*Rhus Cotinus*, L.), from which it probably differs only in the position of the hydroxyl group in the pheno-y-pyrone ring.—*Jour. Chem. Soc.*, Mar., 1896, 206-212.

*Autumnixanthin*—*The Yellow Coloring Matter of Autumn Leaves*.—In contradiction to the view of Fremy, Hoppe-Seyler and Schunck, who has attributed the yellow coloration of leaves in autumn altogether to the conversion of chlorophyll into phylloxanthin, Staas finds that the yellow color of such leaves is due to the presence of a substance, soluble in alcohol, for which he proposes the name autumnixanthin. It differs from phylloxanthin, produced from chlorophyll by the action of hydrochloric acid gas, in not showing the red fluorescence of chlorophyll when dissolved in alcohol.—*Pharm. Jour.*, Feb. 1, 1896, 86; from *Berichte*, 1896, 2807.

*Carotin*—*Distribution and Function in Plants*.—Dr. Schrötter-Kristelli records the occurrence of carotin in the aril of *Afzelia cuanzensis* (Nat. Ord. Leguminosæ) dissolved in a fatty oil, and not—as in all cases hitherto observed in flowering plants—in connection with the chromatophores. The author believes carotin to be nearly related to the group of cholesterins, and to have a function connected with the respiration of the plant. He proposes the name "lipoxanthins" for the group of yellow pigments of plants and animals to which carotin belongs; but they must be carefully distinguished from others which occur dissolved in the cell-sap, and are not connected with the chromatophores.—*Pharm. Jour.*, Feb. 22, 1896, 145; from *Bot. Centralbl.*, lx. (61), 33.

*Carotin*.—Occurrence and distribution in *Pumpkins*, which see under "Materia Medica."

*Pelagaine*—*The Violet Pigment of the Medusa*.—Drs. A. B. and C. Platt have determined the chemical composition of the violet pigment of the medusa (*Pelagia*). It is extracted along with fatty matter by ether or alcohol; the filtrate is evaporated to dryness, the residue treated with solution of soda, and rapidly extracted by carbon disulphide, which, on spontaneous evaporation, yields the pigments as an amorphous residue. It is soluble in alcohol, ether, acetic acid, and carbon disulphide, but insoluble in alcohol. It is bleached by light, and shows no characteristic absorption bands when examined under the spectroscope.—*Chem. News*, Oct. 11, 1895, 185; from *Compt. rend.*, Sept. 23, 1895.

*Plant Pigments*.—Character of the red coloring matter of the aril of the seed of *Celastrus scandens*, which see under "Materia Medica."

## ALBUMINOIDS.

*Including Organized Ferments, Toxines and Antitoxines.**Albumin—Possible Sources of Error with Essbach's Albuminimeter.*—

Mercier calls attention to several possible sources of error when employing Essbach's albuminimeter, now so popular because of the rapidity of making albumin determinations. The principal source of error is due to the fact that picric acid precipitates in the cold not alone albumin, but also peptones, alkaloids, antipyrine, etc., which may also be present. Then, also, the shape of the bottom of the cylinder is of importance, for if round instead of flat the scale is unreliable, and in the case of small quantities of albumin worthless; besides, the volume of precipitate must necessarily vary according to the density of the urine, and, furthermore, it has been shown that the results by Essbach's method may vary considerably from those obtained by the gravimetric method, samples that were indicated by the albuminimeter to contain only traces of albumin being shown gravimetrically to contain from 2 to 4 Gm. per liter. The latter method should therefore always be employed in cases in which the presence of peptone, etc., has been determined, and this determination of the absence of these should always be preliminary to the application of Essbach's method.—Pharm. Centralh., Aug. 29, 1895, 502; from Jour. de Pharm., Anvers, 1895.

*Albumin—Use of Resorcin as Reagent.*—Carrez recommends that to a solution of 1 Gm. resorcin in 2 Gm. water 2 Cc. of urine be added, when, in the presence of albumin, a white ring is formed at the point of contact of the two fluids. Alkaloids, urates and urea do not interfere with the reaction; but peptone gives a precipitate, which, however, disappears on heating.—Pharm. Centralh., Oct. 17, 1895, 595; from Rép. de Pharm., 1895, 214.

*Albumose—Separation from Peptone.*—A. Bömer recommends the use of zinc sulphate as preferable to ammonium sulphate for the precipitation of albumose, as it obviates the difficulty encountered in quantitative operations from the presence of nitrogen in the precipitating agent. Albumose is completely precipitated by zinc sulphate, but in case the material operated upon contains ammonium salts, the possible formation of a sparingly-soluble double sulphate— $(\text{NH}_4)_2\text{SO}_4 \cdot \text{ZnSO}_4 + 6\text{H}_2\text{O}$ —must be borne in mind and provisions made against consequent inaccuracy in determining albumose on the basis of the nitrogen in the precipitate.

*Albuminate of Copper—Physiological Action.*—Filehne has studied the action of copper when combined with albuminous substances, and finds that a *cupratin* compound, analagous to Schmiedeberg's *ferratin*, can be administered to dogs and cats in doses of 2.6 grammes within twenty days without injurious effects. He infers that compounds of copper and albumin would not be injurious in human food, and that from 0.01 to 0.02



gramme of copper daily in this form would not cause any sensible disturbance. The case is very different with *copper stearate*, which causes serious degeneration of the liver and kidneys when administered for some time, though it was not possible in this way to produce acute poisoning.—Pharm. Journ., May 2, 1896, 344; from B. Med. Wochenschr., 1896.

*Blood—Investigation of an Anti-Coagulant Produced by Propeptones.*—It has been known for some years that propeptones render blood incoagulable by causing the formation in the organism of a substance possessing anti-coagulant properties. C. Delezenne finds that this substance is formed exclusively in the liver, and it appears to be either peptone modified by the liver or a direct product of that organ, the secretion of which is provoked by peptone. The rapidity with which the anti-coagulant effect is produced on administering the peptone, and other facts, point out that the first hypothesis is the more likely. The substance has not yet been isolated. In solution it resists a temperature of 100° C. for a prolonged period, though access of air causes the liquid to lose its properties rapidly. For its preservation air must, therefore, be excluded, or a few drops of chloroform added.—Pharm. Jour., May 30, 1896, 424; from Compt. rend., cxxii., 1072.

*Blood—Fallacy of Almen's Test.*—In a previous paper, Prof. Chas. F. Crowley had recommended the use of peroxide of hydrogen in preference to old oil of turpentine or ozonized ether in Almen's blood test, but experience since then forces him to condemn the test in toto. The test consists in mixing freshly prepared tincture of guaiac with a blood solution, when, upon adding to the creamy mixture formed old oil of turpentine, ozonized ether, or peroxide of hydrogen, a blue color tinged with green makes its appearance. Prof. Crowley finds that this bluish-green color is brought out equally as well by the direct addition of nitric acid to freshly prepared tincture of guaiac, and by the addition of solution of ferric chloride containing nitric acid due to the oxidation process used in its preparation. Fibrin treated with tincture of guaiac followed by the addition of peroxide of hydrogen, reveals the blue color around the solid fibrin, and turpentine or peroxide of hydrogen added to pus in the presence of tincture of guaiac also causes the same blue color. Almen's test, if it can be called a test at all, must be regarded as purely negative, the failure to obtain the characteristic color indicating the absence of blood; but the appearance of the blue color does not indicate the presence of blood, the presence of which must be confirmed by the characteristic bands in the spectrum, and the formation of hæmin crystals.—Drug. Circ., Jan., 1896, 6.

*Milk—Examination and Estimation.*—The Society of Swiss Analytical Chemists have adopted a course of analysis for the determination of the quality of milk, its impurities and adulterations, which may be briefly out-

lined as follows: The determination of adulterations must embrace at least: 1, estimation of acidity; 2, determination of specific gravity of the milk; 3, determination of the specific gravity of the serum; 4, estimation of the fat; 5, estimation of the dry substance; 6, estimation of the albuminoids by Kjeldahl's method; 7, estimation of milk sugar; 8, of the mineral substance; 9, of the individual mineral constituents; determination: 10, of nitrates; 11, of preservative agents; and 12, microscopic examination.

The determination of natural faults or of impurities must embrace: 1, determination of acidity; 2, the fermentation test; 3, the caseine test with rennet; 4, microscopic examination; to which may be added: 5, the determination of the quantity of excrementary substance, and 6, examination of the individual pathogenic bacteria. Upon the determination of faulty condition, the determinations of specific gravity, fat, mineral substance (quantity and kind) may also be useful.

The judgment of quality is aided by the physical characters of the sample. Reddish, blue, malodorous or salty-tasting milk must be rejected. Fresh milk, an admixture from several cans, must respond to the following requirements:

Specific gravity of the milk at 15° C.....	1.029-1.034
Specific gravity of the serum at 15° C.....	1.027-1.030
Fat, minimum .....	3 per cent.
Dry substances, minimum .....	12 per cent.
Acidity, minimum .....	4.5 acid degrees.

For the preservation of milk samples for future examination the addition of dichromate of potassium in proportions of 1 Gm. per liter is recommended.—Pharm. Centralh., Jan. 9, 1896, 20-21.

*Milk—Chemical Examination.*—Dr. Chas O. Curtman at a meeting of the Society of German Physicians, St. Louis, in November, 1894, gave a lecture on the chemical and physical examination of milk, which he has now communicated to "Pharm. Rundschau" (Dec. 1895, 281-285). The paper, which is accompanied by a number of illustrations showing the apparatus that has been devised for the modern methods of examining milk, is characterized by terse and clear diction, and will be consulted with profit by those engaged or interested in milk analysis. Bringing little that is absolutely new, no abstract is attempted for this report, since it cannot be profitably condensed.

*Milk Analysis—A New Lactobutyrometer.*—A. Longi describes the butyrometer shown by Fig. 72 and its use as follows: Two cylindrical vessels *A* and *B* are united by a Schellbach's tube. The capacity of *A* is 26 Cc.; of *B* 70 Cc., and that of the tube from *a* to *b* is 5 Cc., its diameter being 6 to 7 Mm., while the scale is divided into 50 parts (= each  $\frac{1}{10}$  Cc.). For use in the milk examination an ether-alcohol mixture is

prepared with 500 Cc. each of washed ether and 90 per cent. alcohol; to this 5 Cc. of ammonia, sp. gr. 0.92, is added and sufficient "Coccin 2 B" to give it a red color. For the examination, 10 Cc. of milk and 20 Cc. of

FIG. 72.



Milk  
Analysis.

the ether-alcohol mixture are poured into the instrument, the mixture is well shaken, allowed to run to and fro from *A* to *B* several times, and after a final shaking is allowed to accumulate in *A*, the instrument being placed in water at 39° to 40° for twenty minutes. The yellowish fatty layer which separates on the surface of the red-colored alcohol-ether mixture is then easily read off, and the percentage of fat determined by the aid of Schmidt and Tollens' tables.—Pharm. Centralh., Febr. 27, 1896, 127; from Gazz. Chim. Ital., 1895, 441.

*Milk Analysis—Unreliability of the Cremometer.*—P. Caze-neuve and E. Haddon observe that in the case of boiled milk the indications of the cremometer are incorrect, because the casein is oxidized during the boiling in air, and becomes partly insoluble. If air is excluded, however, and the milk heated for an hour at 98° to 100° C., no such change occurs, and the indications of the cremometer are as reliable as in the case of raw milk.—Pharm. Centralh., Aug. 15, 1895, 461; from Jour. de Phar., et de Chim.

*Milk—Determination of Added Water.*—Drechsler states that when the specific gravity of the milk serum, obtained from milk that has coagulated spontaneously, sinks below 1.027, it may be assumed that water has been added to the milk.

*Milk—Determination of Fat.*—A. Liebreich recommends the following convenient method for determining the fat in milk: 10 Cc. of the milk are shaken with a small quantity of incinerated quartz sand and 100 Cc. of ether thrice at intervals of 5 minutes in a mixing cylinder. One half of the clear ether layer is distilled in a flask, the residue dried at 100° and weighed.—Pharm. Centralh., Feb. 13, 1896, 96; from Chem. Ztg., 1896, 21.

*Milk—Preservative Compound.*—Tollner gives the following formula for a milk-preservative: 5 p. ammonium borate and 20 p. sugar are boiled to syrup with 30 p. water; this syrup is mixed with 20 p. boric acid, 2.5 p. borax and 7.5 p. milk sugar, and the doughy mass is dried and powdered. The substance is almost tasteless, non hygroscopic, and efficient, 0.5 Gm. being sufficient to preserve milk in good condition for from 24 to 30 hours longer than it would ordinarily keep.—Pharm. Centralh., Jan. 23, 1896, 65; from Milch-Ztg.

*Milk—Potassium Chromates as a Preservative.*—G. Denigès calls attention to the use of potassium chromate and dichromate as a preservative of milk. It seems that the use of 0.1 Gm. of dichromate will preserve (1

liter? Rep.) milk for twenty-four hours, 0.25 Gm. for twelve or fifteen days, whilst 4 Gm. will produce the same result for about four months, but its use should on no account be allowed, as it produces serious internal troubles. In one case that came under the author's notice the preservative was entirely composed of neutral chromate; in another, one part of the neutral salt was mixed with two parts of the dichromate. The adulteration—for such it must be regarded—is readily detected by adding 1 Cc. of 2 per cent. solution of silver nitrate to an equal volume of the sample and shaking, when a reddish yellow tint is produced, varying in intensity according to the amount of chromate. By means of a blank test and diluting the milk with an equal volume of water, 0.02 Gm. per liter can be readily detected.—Pharm. Jour., Sept. 28, 1895, 262; from Bull. Soc. Pharm. de Bordeaux, xxxv., 235.

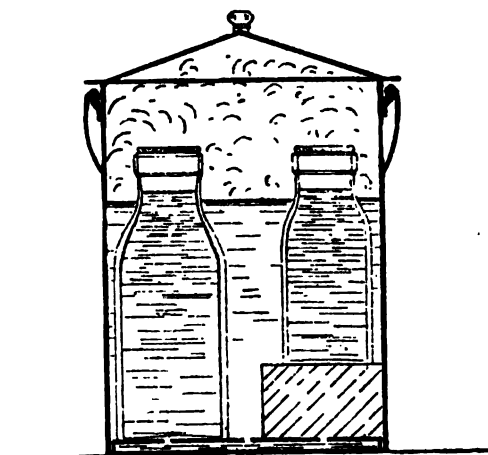
*Milk—Sterilization and Pasteurization.*—Dr. H. L. Russell, in view of the present agitation concerning the purity of food products and the ever increasing interest in the question, makes some practical observations with particular reference to the purity of dairy products, and methods that are adapted to rendering milk for family use wholesome and innocuous. The most important condition to render milk wholesome is the prevention of bacterial influence upon it, a condition which may be brought about within certain limits by care in handling at the dairy. The difficulties, however, to secure such a product are so great as to make it impracticable, and it is customary, therefore, to resort to other modes of eliminating (or destroying) the bacteria in milk. The agent most usually employed for this purpose is heat, and it is applied in two ways: Firstly, by heating the milk to near boiling for some time, whereby all the bacterial life in the milk is affected more or less, the micro-organisms in the vegetative condition being entirely destroyed and the more resistant spores killed or weakened to such an extent that their power of development is diminished. This process is known as

*Sterilization*; but unfortunately, the milk so treated has its physical and chemical characteristics altered somewhat, and there is a pronounced “cooked” taste, which is objectionable to some. A second method is that of

*Pasteurization*, so named in honor of Pasteur, who applied the principle to heating wines, which consists in the application of a much lower degree of heat for a shorter time. The high temperature is maintained long enough to destroy the developing bacteria, but no attempt is made to kill the spore-bearing forms that are always able to withstand a much severer treatment. The conditions as to temperature and time, under which the vegetating bacteria are destroyed by heat, vary with different germs. As a rule, exposure to a temperature of 130°–135° F. for ten minutes is usually fatal, but some bacteria, notably the tubercle bacillus, are able to withstand a higher temperature. Inasmuch as the danger from

this particular species is greater than from any other disease form, the minimum limit selected is the maintenance of a sufficient heat for a sufficient time to destroy this organism, which, in the author's experience, is  $155^{\circ}$  F. for fifteen to twenty minutes. But while the heating process is essential in destroying the vegetating bacteria, it is quite as necessary that the product should be immediately cooled and thoroughly chilled, so as to prevent the germination and growth of the spores that are not destroyed by the heat. The author explains the relation of the temperature changes that take place during the Pasteurizing and cooling of the milk to the growth of the bacteria by the aid of a diagram, and makes some practical observations concerning the process as applied in the family, the apparatus being shown by the accompanying cut (Fig. 73), which is quite simple. A

FIG. 73.



Pasteurization.

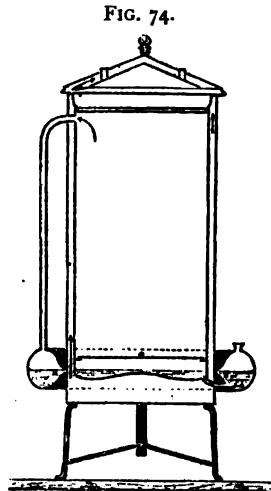
covered tin pail will answer for the reception of the bottles and water. A shallow bench on which to set the bottles to keep them from "bumping," may be made from a tin plate punched full of holes. An inverted bowl or block will serve to equalize level of milk in different sized bottles where such are used. The cover is removed when the temperature of water is taken. The bottles may be closed with clean cotton batting. The fundamental principles involved in the best apparatus for Pasteurization are briefly generalized as follows:

1. The apparatus shall be constructed so that all of the milk can be heated for a definite length of time at a definite temperature.
2. All parts of the apparatus should be easily accessible, so that they may be thoroughly cleaned and sterilized.
3. The apparatus should be as simple as possible in construction, economical in use, and the milk should be protected during the Pasteurizing process and subsequently from reinfection.

The salient advantages that commend Pasteurized products to the consumer are two-fold, viz.: "enhanced keeping quality," and "freedom from noxious bacteria." But no more fallacious idea could be gained than that any kind of milk can be successfully treated by this process. The fewer bacteria there are in the milk, the less spores there will be, so that

fresh milk that has been cooled thoroughly is best suited for this purpose.—Pharm. Rundschau, May, 1896, 104–107.

*A New Sterilizing Apparatus* is described in "Pharm. Centralh. (Aug. 1, 1895, 438), and its construction shown in the accompanying cut (Fig. 74). It is characterized by the rapidity with which steam can be generated by means of an ordinary Bunsen flame, and the facility with which the interior of the apparatus can be maintained at a temperature of  $100^{\circ}$  C., with a small quantity of water. The reservoir for the water supply is situated near the bottom of the cylindrical apparatus which it surrounds in the shape of a tubular ring. The bottom of the apparatus, to which the flame is applied, is slightly convex, and the influx of water is so arranged that the highest part is only slightly convex (1 Cm. deep), thus securing the rapid development of steam, the excess of which returns through the pipe opening near the top into the reservoir beneath, where it is condensed. A perforated diaphragm, a short height above the water, separates the steam chamber from the water, while the sides of the apparatus and the lid are jacketed, thus securing a hot-air chamber which prevents the cooling of the steam in its ascent through the fabrics that are being sterilized. The apparatus is durably constructed, the inner vessel of copper, the internal dimensions being 20 to 25 Cm. diameter, by 40 to 50 Cm. high.—Pharm. Centralh., Aug. 1, 1895, 438.



New Sterilizing Apparatus.

*Milk—Practical Method of Sterilization for the Household.*—J. A. Forrest observes that it has been demonstrated that milk when heated to a temperature of  $100^{\circ}$  C. from twenty to thirty minutes, undergoes practically the same chemical change that results when it is sterilized at the same temperature under pressure. He believes with Dr. C. W. Earle that milk is injured as food for infants if heated above  $80^{\circ}$  C., but that Pasteurization at temperatures ranging between  $70^{\circ}$  and  $80^{\circ}$  C., destroys most of the ordinary germs of milk, whilst the milk itself is not injured. To enable housekeepers to do this without the necessity of a thermometer, he suggests that a jar containing a pint of milk be placed in three pints of water contained in a cylindrical tin vessel, of such size that the levels of the water and milk are about equal when the jar is supported half an inch from the bottom of the water-bath. The temperature of the water is raised to the boiling point, when the heat is withdrawn, and the jar allowed to remain in the heated water for about fifteen minutes, its contents being stirred frequently during the entire operation so as to prevent the formation of a

scum, or the separation of cream if covered. The source of heat should be such as to cause the water to boil in not less than 25 minutes nor more than 35 minutes. Under these conditions, the temperature of the milk rises to  $75^{\circ}$  when the water boils, and when the heat is withdrawn from the water it continues to rise till it meets the falling temperature of the water, attaining a maximum at  $78^{\circ}$ – $80^{\circ}$  C.—Pharm. Jour., April 11, 1896, 281.

*Milk—Proper Way to Sterilize.*—Malcolm Morris gives the following directions for sterilizing milk: Place the milk in a clean bottle and plug the mouth with clean cotton wool. Then stand the bottle in a suitable metal vessel so that it is raised about half an inch from the bottom, pour cold water into this vessel until it attains the level of the milk, and heat slowly until the temperature of the water reaches the boiling point. Now take the vessel from the fire and cover over loosely with a piece of woollen cloth for half an hour, after which remove the bottle and store it in a cool place.—Pharm. Journ., Aug. 17, 1895, 149; from "Practitioner."

*Milk—Sterilization and Lactic Fermentation.*—The experiments of P. Cazeneuve on the sterilization of milk and the destruction of the lactic ferment lead him to the conclusion that, if it is true that a heat of  $110^{\circ}$  for half an hour is required to kill the lactic ferment, as pointed out by Pasteur and by Hueppe, a temperature of  $98^{\circ}$  to  $100^{\circ}$  applied for an hour often destroys it, and in all cases attenuates it so far as to render it sterile in deoxygenated milk. As for the pathogenic ferments, they are certainly destroyed. Industrially, an apparatus, which has been described by the author, permitting the complete immersion in boiling water of the sterilizing bottles and the total deoxygenation of the milk and the containing vessel, secure the indefinite preservation of the milk without any savor of rancidity and without coagulation. Milk at  $98^{\circ}$ – $100^{\circ}$  has digestive properties, as demonstrated by the chemical observations and experiments of Dr. Rodot, at least equal to those of raw milk, whilst it has the superiority of not being the vehicle of certain contagious microbia. It has the advantage over milk boiled at  $110^{\circ}$ – $120^{\circ}$  of not turning yellow, and not taking the taste of burning or of peptone so frequently observed in milk sterilized at this temperature. In the author's observations the lactic ferment appears to be little diffused in the air.—Chem. News, Oct. 11, 1895, 185–186; from Bull. Soc. Chim de Paris, No. 9, 1895.

*Milk—Convenient and Expeditious Method of Distinguishing the Raw from the Boiled.*—Prof. Max Rubner recommends the following method of distinction between boiled and raw milk, which is based upon the fact that during sterilization at  $100^{\circ}$ , respectively during boiling, the albumin is coagulated, whereas the casein is not. If, therefore, the sample is treated with salt in excess, the casein is coagulated, and readily separated by filtration. In the filtrate the presence of lactalbumin is easily deter-

mined by heating to boiling ; if no coagulum results, the albumin has been coagulated by the previous boiling or sterilization of the milk, and the character of the milk is then easily and quickly determined.—Pharm Centralh., Jan 9, 1896, 18 ; from Hygien. Rundschau, 1895, 1021.

*Milk-Substitute for Children—Proper Composition and Preparation.*—Backhaus, on the basis of numerous analyses of mother's milk, accepts the following as the most desirable composition of a milk-substitute for children : Water, 88.25 per cent. ; albumin, 1.75 ; fat, 3.50 ; milk sugar, 6.25 ; ash, 0.25 per cent. Such a substitute, approximately at least, may be obtained by a process of centrifugation of milk under addition of the rennet ferment, at a determined temperature, whereby an easily soluble portion of casein, all the albumin and milk sugar, are represented in the resultant serum, while the fat content is increased to the proper proportion by the addition of cream.—Pharm. Centralh., Oct. 31, 1895, 625 ; from D. Med. Wochenschr., 1895.

*Kumyss—A Reliable Formula.*—Harry W. LeRoy has used the following formula for kumyss for more than four years, and recommends it as yielding a satisfactory preparation that will keep good for at least six months : Milk, water, of each 10 pints ; beer yeast,  $\frac{1}{2}$  fl. oz. ; sugar, 4 ozs. Dissolve the sugar in a little of the water with the aid of heat, add the remaining ingredients, mixing thoroughly, and then strain. Fill ordinary or champagne pint bottles up to about one inch and a half from the cork, tie the latter down firmly, paraffin the cork well, and set the bottles aside to ferment for twenty-four hours at a temperature of 50° to 60° F. ; then shake well, put the bottle into a cold place, lying on the side, and shake again about twice a week.—Merck's Rep., Jan. 15, 1896, 31.

*Galacton—Preparation.*—Al. Bernstein prepares from skimmed milk by the aid of a species of bacteria (*Bacillus peptofaciens*), isolated by him from milk, a liquid which contains only traces of acetic acid, but no lactic acid. If this fluid is heated to boiling at the proper stage, the albumin that has not become converted into albumose or peptone is precipitated. The fluid is then sterilized, acquires a reddish-yellow, more or less dark color, and constitutes a new nutrient which he names "galacton." By the addition of "mash" or of milk sugar ferment it may be converted into a kind of beer ; or a stronger alcoholic preparation, "galacton wine" may be obtained by adding cane sugar before fermentation.—Pharm. Centralh., Sept. 12, 1895, 527 ; from Hygien. Rundsch.

*Thyroprotein—A New Albuminoid.*—Notkine has isolated an albuminoid from the thyroid body, differing in its properties and composition from all other albuminoids hitherto described, which he has named thyroprotein. The new body splits up under certain conditions, yielding a carbohydrate which is transformed with difficulty into a reducing substance. With a fairly strong solution of ferric chloride the albuminoid as-



sumes a gelatinous consistence, and by tannin it is precipitated in form of thick flakes or as a transparent gelatinous substance, according to the strength of the solution. It dissolves in weak acid, and is precipitated by alcohol, the precipitate rapidly becoming insoluble in water. From experiments on animals it appears to be very toxic, and is slowly eliminated. It acts at first as an excitant, afterwards as a paralytant, probably on the central nervous system.—Pharm. Journ., Nov. 2, 1895, 365; from Nouv. Rem., xi., 422.

*Toxines—Effect of Rectal Injection.*—P. Gibier finds that the rectal injection of relatively large doses of diphtheria and tetanus toxines in the case of rabbits, dogs, and guinea-pigs, is not followed by any apparent effect, and does not confer immunity with regard to the effects of those toxines, however often the injection may be repeated. The rectal mucus appears to retain, and perhaps destroy, the active principle of the toxines as well as of the anti-toxines.—Pharm. Journ., May 30, 1896, 424; from Compt. rend., cxxii., 1075.

*Toxalbumins—Precipitation and Possible Differentiation by Nuclein.*—Tichomiroff has studied the effect of precipitation by nuclein upon various toxalbumins. The precipitate obtained by treating a 5 per cent. solution of pure *ricin* with an 8 per cent. solution of nuclein was found to be equally poisonous with the pure ricin itself. The precipitate obtained from the *poison of tetanus*—after the removal of the bacilli from the culture medium by filtration—was to be fatal to mice with symptoms of tetanus, and it retained its poisonous property unimpaired after it had been kept dried for a month. The *toxalbumin of diphtheria* behaved in a similar manner. On the other hand, culture of the *Streptococcus pyogenus*, though originally highly poisonous, yielded a precipitate with nuclein which proved quite harmless, and negative results were also obtained with cultures of *Staphylococcus aureus*, with the *typhoid bacillus*, and with the *cholera spirillum*. The author observes that these observations point to the possibility of differentiating poisons according to their behavior towards nuclein. It is well known that nuclein will precipitate albumins and pro peptones from acid solution, but it would be too hasty to conclude that all poisons which are thrown down by nuclein are of an albuminous nature, for it has been observed that in the formation of such precipitates the really precipitable substance is apt to be associated with other substances which, when similarly dealt with in pure solutions, are not precipitable.—Pharm. Jour., Feb. 22, 1896, 141; from Zeitschr. Physiol. Chem., July, 1895.

*Diphtheria Antitoxin—Nature of Active Constituent.*—Guérin and Macé have endeavored to isolate the active constituent from the serum of horses immunized with respect to diphtheria. By treatment with ten times its volume of alcohol, the alcoholic filtrate contained a small quantity of alkaloidal substance, having no antitoxic power; while the albuminous

precipitate produced yielded an aqueous solution possessing extremely powerful antitoxic properties. The authors conclude that the active constituent of diphtheria antitoxin is of the nature of a soluble ferment.—Pharm. Journ., Aug. 31, 1895, 178; from Comp. rend., cxxi, 311.

*Diphtheria Antitoxin—A Dry Commercial Form.*—A London manufacturing firm has introduced a dry form of diphtheria antitoxin—"Serum antidiphthericum exsiccatum"—which is described as occurring in fine golden yellow needles, and as soluble in twice its volume (weight ? Rep.) of cold water. It is, furthermore, claimed to be indefinitely permanent under ordinary conditions, and that the contents of a tube are equivalent to 10 Cc. of the liquid normal diphtheria antitoxin.—Pharm. Centralh., Jan. 23, 1896, 40; from D. Med. Ztg.

*Antitoxin—Statistics of its Value in the Treatment of Diphtheria.*—The report of the Metropolitan Asylum's Board (London) embodying the results of a year's experience in the use of diphtheria antitoxin, shows, that while the percentage of deaths has been much less since the introduction of the new remedy, the statistics given show that 28.1 per cent. of the patients that were treated with antitoxin died, whilst only 13.4 per cent. of those *not* treated with antitoxin died. There has, however, been a reduction in the death-rate from diphtheria of 7.1 per cent. in 1895 over 1894; but only 1.5 per cent. of this was gained by the antitoxin treatment, while in the cases not so treated there appears to be a gain of 16.2 per cent.—Pharm. Jour., April 11, 1896, 292.

*Diphtheria-Serum—Percentages of Recovery in a Russian Hospital.*—Particulars are given in "Vratch" of the treatment of 310 cases in St. Vladimir's Hospital for Children in Moscow, the results being very favorable. The number of children that recovered was 248, or 82 per cent. of the whole number treated, whereas the death-rate from diphtheria during the past five years in the same hospital was from 40.3 to 47.9 per cent.—Chem. and Drugg., Jan. 4, 1896, 15.

*Tuberculin—Efficiency in the Treatment of Consumption.*—Dr. Koch's famous consumption-cure is growing in use in Berlin. Dr. Sinclair Coghill writes in regard to a case which he has recently treated: "This case confirms me in the opinion I have always held, and still hold, that tuberculin has potent therapeutic efficacy in the treatment of tuberculosis when used judiciously and with caution in doses and under conditions adapted to each individual case."—Chem. and Drugg., Jan. 4, 1896, 15; from Lancet.

*Serpent Venoms—Relative Toxicity.*—A. Calmette has made a series of interesting experiments on the relative toxicity of those serpent venoms which have the reputation of being most deadly. The experiments were carried out on the fresh venom of the Capel cobra, a one-eyed variety from Indo-China; the rattlesnake of North America; the stanchion

snake from Martinique; the horned viper and Cleopatra's aspic from Egypt; the dried venom of the Australian black snake; the tiger snake; the broad-headed snake; the death adder, and the Trionocephale of the banana tree from Indo China. Each of these venoms exhibits marked difference in toxicity, but a more interesting point is that the toxicity of the same serpents' venom is increased in proportion to the time during which it has been deprived of food. The author's observations, which are given in form of a table, also show that the sensitiveness of the rabbit and guinea pigs towards the same venom is not proportional to the weight of these animals, and the same points are noticed in experiments carried out on dogs. The toxic power of venoms is therefore variable, depending upon the species of animal experimented on, the species of serpent, and also upon the time which has elapsed after the serpent has bitten or had a meal before the venom is collected.—Pharm. Jour., Sept. 7, 198; from Les Nouv. Remèdes.

*Serpent Venom—The Blood of the Serpent, the Antidote to its Poison.*—Messrs Phisalix and Bertrand have announced at the Academy of Science (Paris) that, as the result of their researches, they believe themselves justified in affirming that the blood of venomous reptiles is the true antidote to their poison. They have proved this to be true as regards the venom of the viper. After having been modified by heat, the blood of the viper, applied in a dose of  $\frac{1}{4}$  Cc., was found to be sufficient to prevent the effects of a mortal dose of venom.—Chem. and Drugg., Nov. 23, 1895, 749.

*Cobra Poison—Immunity.*—Prof. T. R. Frazer has stated in a paper read before the Royal Society of Edinburgh, that animals—man included—may be made non-susceptible to the venom of the cobra by injecting the venom in minimal doses, gradually increased. The minimum dose fatal to rabbits having been determined, it was finally increased in amount to 50 times the original fatal limit—a rabbit exhibited having received in one hundred and fifty days enough cobra poison to kill two horses. *A successful antidote* for the poison of the cobra is found to be a mixture of  $\frac{1}{10}$  Cc. of the serum of a rabbit immunized up to thirty times the minimum fatal dose.—Chem. News, July 5, 1895, 12.

*Snake Antitoxin—Cause of Efficiency.*—Further experiments have led C. Phisalix and G. Bertrand to revise their former expressed opinion that the blood of vipers and other snakes contains toxic principles analogous to those in their venom, and that the animals owed their immunity against the poisonous effects of the latter to the fact of being accustomed to its presence. The authors now conclude that the immunity is rather due to the existence of antitoxic principles in the blood, which result in a sort of auto-vaccination. The serum of the viper is said to possess a very energetic antitoxic power, 0.25 Cc. sufficing to protect a guinea-pig against a

fatal dose of the venom. The effect, however, is fleeting, and disappears in a few days.—Phar. Jour., Dec. 28, 1895, 535 : from Compt. rend., cxxi., 745.

*Antivenenum*.—*A Blood Serum Immunized with Serpent Poison*.—Frazer has given the name "antivenenum" to blood serum from animals which have been immunized with serpent poison, and recommends it as an antidote against the bite of poisonous serpents—Frazer's experiments having been made with the venom of the cobra. The preparation has not yet been marketed.—Pharm. Centralh., Feb. 13, 1896, 92.

*Ferments—Kinds Concerned in the Manufacture of Arrack*.—F. A. F. C. Went and H. C. Prinsen have investigated the organisms of the substance known as

*Raggi*, which is used in Java for the fermentation of arrack from rice-starch. The principal agent concerned in the fermentation is found to be a true *Saccharomyces*, to which the authors give the name *S. Vordemannii*; but it contains besides two new organisms, which they have named respectively *Chlamydomucor oryzae* and *Monilia javanica*. The first of these new microbes consists of a much branched but unseptated mycelium, and possesses the property of converting amylopectin and ordinary dextrin into dextrose. It is aerobic, coagulates milk, does not invert saccharose, and does not ferment glucose. The second new organism, *Monilia javanica*, has the power of fermenting dextrose, saccharose (which it first inverts), raffinose, maltose, and levulose, but not lactose. The authors suggest that *Chlamydomucor oryzae* may be a stage in the cycle of development of *Rhizopus oryzae*.—Pharm. Journ., Jan. 25, 1896, 78; from Med. van het Proefstat., West Java, through Bot. Zeitung, 1895, 2te Abth., 143.

*Pneumococcus—Action on Sugars*.—The experiments of Frankland, Stanley and Frew (1891) with the pneumococcus of Friedländer obtained by them from the Hygienic Institute of Berlin, led them to conclude that while this substance is capable of inducing fermentation in solutions of glucose, saccharose, lactose, maltose, raffinose, dextrin, and mannite, it is without action on solutions of glycerin or of dulcitol. L. Grimbart has recently experimented with what was presumably the same pneumococcus, cultivated at the Pasteur Institute, Paris, but finds that it energetically attacks both glycerin and dulcitol, in addition to causing fermentation in the case of glucose, galactose, arabinose, mannite, saccharose, lactose, maltose, dextrin, and potatoes. The products of the fermentation, which in the former case were stated to be ethylic alcohol and acetic acid, with a small proportion of formic acid, and traces of another, probably succinic acid, are by Mr. Grimbart found to be ethylic alcohol, acetic acid, lactic acid, and succinic acid, and they varied with the nature of the sugar used. Ethylic alcohol was absent in the case of arabinose and potatoes, was produced in traces only from glucose, saccharose and maltose, and

was mixed with higher alcohols when dextrin was fermented. Acetic acid was obtained in every case. Lactic acid was obtained to the exclusion of succinic acid in the case of glucose, galactose, arabinose, glycerin, and mannite; both acids were yielded by saccharose, lactose and maltose, while dulcitol, dextrin, and potatoes yielded succinic acid to the exclusion of lactic acid.—Pharm. Jour., Dec. 28, 1896, 533; from Jour. de Pharm. (6) ii., 529.

*Yeast-Cells—Variations.*—R. C. Hausen, at the Ipswich meeting of the British Association (1895), read a paper on the variations of yeast-cells. His experiments showed that, if yeast is subjected to varying sets of conditions, specimens are produced which differ from the original organism in being incapable of producing a film and endogenous spores. Some new varieties produced by gelatin culture had a greater fermenting power than the original vegetable cells produced. In the case of bacteria, Frankland found that the power of fermentation was lost by culture; but no such effect was produced with alcoholic yeast, and it was impossible to produce a variety entirely without fermenting power. In cultures carried on at high temperatures the cells multiplied vigorously; at first the new characteristics assumed were transitory, but later they became permanent properties. Temperature was not the only influence at work, water without nutritive substances and aeration being insufficient.—Chem. & Drugg., Sept. 21, 1895, 454.

*Compressed Yeast—Process of Manufacture.*—The "Chemist and Druggist" (Aug. 24, 1895, 322-323) quotes Mr. Jago on the subject of manufacturing compressed yeast. He says a ladleful of the "barm" is put into a vat of malt mash; by and by a scum begins to form on the surface. This is skimmed off, and constitutes the new generation of the yeast family, the *firstlings* being unfit for use, while the *middle* skimmings constitute the "barm" that is esteemed in brewing and bread-making. The *tail* skimmings are yeast cells which have been starved of nitrogen, and are consequently ferments. The best "barm" of all is that which overflows from beer-casks during the final fermentation which some brewers know how to accomplish with advantage to their ale. The poorest yeasts are those yielded by brews containing much added sugar or glucose.

In the manufacture of compressed yeast the collection of the ferment begins about twelve hours after fermentation has set in, and continues uninterruptedly for twelve hours. The skimmed yeast is first mixed with water, and is then passed through a series of mechanical sieves, by which the grains are removed. It is then washed by decantation two or three times, care being taken not to carry this process too far, otherwise the contents of the cells are weakened. It is again sifted through finer sieves. At the final decantation the young and weak cells come to the surface first, and are rejected; the remainder is collected, passed through a filter

press, and, as soon as it is dry enough, it is packed into packages, so as to prevent discoloration by air. Mr. Jago says that "eternal vigilance in the course of manufacture is the secret of excellence in compressed yeast." The addition of starch is unnecessary, as its sole object in earlier days was to absorb moisture now got rid of by the use of efficient filter-presses; nevertheless, 20 per cent. of starch—not more—is considered a desirable addition because the mixture is drier, and is easier handled.

*Soluble Ferments—Systematic Review.*—F. Casson, in a paper read before the "Midland Chemist's Assistants' Association," gives an interesting review of the characters, preparations and uses of the soluble ferments. The formed or organized ferments, embracing the moulds, the *Saccharomycetes* or yeasts, and the *Schizomycetes* or *Bacteria*, are not dealt with in Mr. Casson's paper, which is confined to the unformed or soluble ferments, and particularly to the diastatic, peptic, rennet, and pancreatic ferments. The paper is given in an abstract which cannot be profitably condensed, and reference must therefore be had to the latter in *Pharm. Journ.*, Jan. 18, 1896, 55-56.

*Soluble Ferments—Oxidizing Properties.*—G. Bertrand states that the color changes produced on exposure of the juice of beet-root, potato tubers, and other vegetables to the air are due to the oxidation of tyrosin under the influence of a soluble ferment, which he proposes to call

*Tyrosinase.* This ferment belongs to a class to which the author has applied the generic name "oxydase," and it is found naturally associated with tyrosin in numerous instances, as in the beet-root, dahlia, etc., but also occurs in several fungi not containing tyrosin. The author compares tyrosinase with laccase (which see), the only oxidizing soluble ferment previously known, which causes the latex of the Tonquin lacquer tree to become insoluble when exposed to air, but is without effect on tyrosin.—*Pharm. Journ.*, June 27, 1896, 501; from *Compt. rend.*, cxxii., 1215.

*Soluble Ferments—Solubility in Alcohol.*—The experiments of A. Dastre show that soluble ferments are not entirely insoluble in alcohol. It is true that the digestive ferments and those of blood taken in the dry state, are totally insoluble in strong alcohol, but it is otherwise when the alcohol is mixed with water. Trypsin was found to be very soluble in alcoholic liquors of the strength of 10 to 25 per cent., but less so in 50 per cent. and stronger solutions. The amylolytic ferment is even more soluble, dissolving in 65 per cent. alcohol, while the ferments of blood are only slightly soluble, and not at all in solutions containing more than 4 or 5 per cent. of alcohol. The scale of solubilities, beginning with the least soluble, is given as follows: Diastatic and proteolytic ferments of the blood, emulsin, ptyalin, trypsin, pepsin, ferment of gaultherin, amylolytic ferment of the pancreas, myrosin. While the ferments mentioned may exercise their specific action in alcoholic media, the presence of the latter is not favor-

able to such action.—Pharm. Journ., Dec. 28, 1895, 535 ; from Compt., rend., cxxi., 899.

*Aspergillus-Emulsin*.—*Relation to Almond-Emulsin*.—In continuation of their experiments, E. Bourguelot and H. Hérissé find that, in addition to amygdalin, salicin, and coniferin, the emulsin of *Aspergillus niger* and of *Polyporus sulphureus*, decomposes arbutin, æsculin, helicin, populin, and phloridzin, but has no action on solanin, convallamarin, convolvulin, or jalapin. It differs from the emulsin of almonds only in that the latter does not affect populin, or phloridzin, whilst the aspergillus emulsin does not act upon milk sugar, which is, according to Fischer, decomposed by the emulsin of almonds.—Pharm. Jour., Nov. 30, 1895, 453 ; from Jour. de Phar. (6) ii., 435.

*Emulsin*.—*Presence in Manihot*.—L. Guignard has ascertained the presence of emulsin in several Brazilian specimens of *Manihot*. Its localization is the same as that of papayin in the Papayaceæ, viz., in the laticiferous system of the embryo. *Myrosin* is also present, but not within the laticiferous tubes.—Pharm. Journ., Aug. 3, 1895, 110 ; from Bull. Soc. Bot. de France, xli., 103-107.

*Emulsin*.—*Presence in Almond oil*, which see, under "Fixed Oils."

*Kolazym*.—A characteristic ferment of *Kola*, which see under "Materia Medica."

*Gaultherase*.—*A Ferment Characteristic of Plants yielding Methyl-salicylic Ether*.—E. Bourguelot has been able to prove that the methyl-salicylic ether extracted by him from several species of *Polygala* and also from *Monotropa hypopitys*, does not pre-exist in these plants, but is produced by the action of a ferment upon a glucoside which is probably identical with the "gaultherin" found by Procter years ago in the bark of *Betula lenta*. Procter had also observed this ferment and its functions, and Schneegans had recently proposed for this ferment the name "betulase ;" but Bourguelot prefers for it the name "gaultherase," as recalling that of the glucoside "gaultherin" upon which it acts, and he sums up his observations as follows : There is a soluble ferment capable of hydrolyzing gaultherin in the roots of *Spirea ulmaria*, *S. filipendula*, *S. salicifolia*, and in *Polygala sp.*, in the bark of *Betula lenta*, the leaves and fruit of *Gaultheria procumbens*, and the petals of *Azalea sp.* In *Monotropa hypopitys* there exists also a glucoside which can be hydrolyzed by the same ferment, and is, therefore, probably identical with gaultherin ; but neither gaultherin nor the glucoside of *Monotropa* can be hydrolyzed by any other known ferment.—Pharm. Journ., May 30, 1896, 421 ; from Compt. rend., cxxii., 1002.

*Laccase*.—*Wide Distribution Among Plants*.—This ferment, which was originally found by G. Bertrand in the latex of the Tonquin lacquer tree, has now been determined by him to be widely distributed among plants. Thus it occurs in the roots of beets, carrots, turnips, and dahlias ; potato

tubers, young asparagus stems; lucerne, clover and rye-grass; the leaves of Jerusalem artichokes and beets, the fruits of apple, pear, quince and chestnut trees, and in gardenia flowers. The presence of the ferment was identified in three cases by its effect in causing oxidation of hydroquinone, pyrogallol, or guaiac resin. A few drops of an alcoholic solution of guaiac resin, when added to a liquid containing a little laccase, causes the white emulsion formed to quickly acquire a blue color.—Pharm. Jour., Aug. 31, 1895, 178; from Compt. rend., cxxi., 166.

*Pectase—Characters and Preparation from Different Plants.*—In former papers G. Bertram and A. Molléve have demonstrated that the pectic fermentation consists in the transformation of pectin into calcium pectate by the agency of the soluble ferment, pectase. They have now obtained this ferment from forty different species of chlorophyll-bearing plants, including five cryptogams. The method of extraction adopted in the case of lucerne and clover was to express the juice from the fresh, full-grown plants, add chloroform to prevent the development of micro-organisms, and keep flasks filled with the sterilized juice in the dark for twelve to twenty-four hours, during which coagulation took place and filtration was then easily effected. Two volumes of strong alcohol were then added to the filtrate, the white precipitate produced was re-dissolved in water by maceration during twelve hours, and this solution yielded the pure pectase on addition of a large bulk of alcohol, to the amount of 5 to 8 Gm. from each liter of juice employed. So obtained pectase constitutes a white, non-hygroscopic powder, which is very soluble in water, and possesses in a high degree the power of inducing pectic fermentation.—Pharm. Journ., Dec. 28, 1895, 535; from Compt. rend., cxxi., 726.

*Papain—Comparison with Pepsin as a Digestive Agent.*—In a former paper (see Proceedings 1894, 848), D. B. Dott has shown that papain compares very unfavorably with pepsin when these are tested by their solvent and peptonizing effects on egg albumen under the usual conditions. Since then Dr. Rideal has endeavored to make out a good case for papain, and attributes unfavorable results to the mistake of supposing that papain should be tested under the same conditions that hold good for pepsin. He notes that papain differs from pepsin in so far as the former acts fairly well in an alkaline solution, while the latter does not, and more particularly that the proportion of fluid to albumen must be much less in the case of papain than is required for pepsin. Mr. Dott has now made experiments on Dr. Rideal's lines, with results that confirm in all essentials what he had previously stated. These results, while confessedly incomplete, seem to show:

1. That the solvent action of the menstruum alone must be taken into account in experiments conducted on Dr. Rideal's lines.
2. That dried papaw juice and the papain prepared from it by purification and precipitation, have very little solvent action on albumen, either in alkaline or acid



solution. 3. That one brand of commercial papain has very little solvent action in alkaline solution, but considerable action in acid solution, in these respects resembling a mixture of papain and pepsin. 4. That even the commercial papain has not nearly the solvent action on albumen which is possessed by pepsin.—Pharm. Jour., March 7, 1896, 182.

*Pepsin—Modern Method of Manufacture.*—Dr. A. E. Dickinson, after giving a brief review of the history of pepsin, communicates the method that is pursued in one of the largest pepsin manufacturing establishments, in which from 3,000 to 10,000 hogs' stomachs may be handled in a single day. The stomachs are taken from the hogs, cleansed, the membrane stripped and iced. They are then as far as practicable trimmed of all fat and extraneous matter, finally being about the size of two hands. They are then put into a warm solution of hydrochloric acid and allowed to remain at a suitable temperature from four to six hours, as may be necessary. The resultant solution is strained to remove undigested fibre, clarified to remove the mucus, and treated to remove peptone: then concentrated at a temperature of not over 110° F. to about 8° or 10° B. This thick solution is then spread upon glass plates, and dried at an unvarying temperature of not less than 125° F. If the weather is favorable, *i. e.*, plenty of dry air stirring, the pepsin may be *brushed* off from the plates within twenty-four hours; but should the air be full of moisture, or the weather exceedingly hot, it may possibly take twenty-four hours longer, and the pepsin *scraped* from the glass. During the process there is need of constant and watchful care; but while the product may suffer at any stage, it is in the vacuum pan and in the drying room where the product is most liable to lose largely of the proteolytic power.—Proc. Nebraska Pharm. Assoc., 1895, 104-108.

*Pepsin—Improvement of the Pharmacopœial Test.*—Dr. R. G. Eccles reviews the difficulties that may arise from various causes in carrying out the pharmacopœial test for pepsin, and again calls attention to the possible advantage of so modifying this test as to use albumen coagulated in solution, in place of coagulated albumen mechanically divided to a suitable condition of fineness for the reaction. He had called attention to such a method in a former paper (see Proceedings, 1890 140), and suggested that experiments be made in this direction; but none seem to have been made, and he therefore again calls attention to this possibly useful improvement of the official test. The change to the use of an albumen coagulated in solution would abolish all grinding or sieve-using, all shaking, and all depending upon the ability to tell when only insoluble particles were left. It would materially simplify the process, and the chances of error would be materially reduced. The albumen is exceedingly finely divided, and is easily prepared as follows: The whites of one, two or more eggs are measured, mixed with thrice their volume of water, and the well-shaken solution is clarified by straining (or filtering, if it can be accom-

plished rapidly by suction). The strained solution is placed in a covered beaker, the beaker immersed in a water-bath so as not to touch the bottom, heated to the boiling point, and maintained at this during ten minutes. It is then cooled to the required temperature, sufficient hydrochloric acid to make a 0.2 per cent. solution is added, then the required amount of pepsin under examination, and all the further care is to maintain the water-bath in which the beaker is immersed at the proper temperature, and to observe when the digestion is complete. Since albumen coagulated in this manner is to a considerable extent soluble in acidulated water, the nitric acid test should be used to determine the point where digestion is nearly or wholly complete.—*Drugg. Circ.*, March, 1896, 52-53.

*Pepsin—Retarding Action of Wine.*—Hermann Peters has made experiments for the purpose of ascertaining in what manner the action of pepsin is retarded by wine, and has come to the conclusion that wine is not a suitable medium for the administration of pepsin. The retarding effect is produced not only by the alcohol present in the wine, but also by the acid tartrate present. Tartaric acid does not interfere with the action of pepsin, but it cannot be substituted in place of hydrochloric acid, the presence of which is an essential condition of digestion by pepsin, and the presence of acid tartrate in wine is prejudicial, because it neutralizes hydrochloric acid, setting free tartaric acid, so that pepsin will contain no free hydrochloric acid.—*Pharm. Jour.*, June 27, 1896, 505; from *Ber. d. Pharm. Gesell.*, iv., 258.

*Peptone—Adulteration and Substitution.*—Gehe & Co. (Report, Sept., 1895) call attention to a case of substitution of peptone, in which *dextrin*, pure and simple, had been offered as dry peptone. An adulteration of peptone with 30 to 35 per cent. of *milk sugar* had previously been noticed.—*Pharm. Centralh.*, Sept. 12, 1895, 525.

*Pancreatin—Components, Characters and Tests.*—In a paper on the digestive ferments of the pancreas, after a brief description of the pancreas itself, R. H. Jones briefly reviews the secretions that are contained in the gland, namely the diastatic, proteolytic, fat-splitting, and milk-curdling enzymes. Of these the proteolytic enzyme, called trypsin, has been shown by Heidenham not to exist in the pancreas ready formed (except in traces) but is formed from the corresponding zymogen by the action of acids or alkalies. The latter part of the author's paper is devoted to the use of the pancreatic ferments in medicine, the so-called pancreatin, which is a mixture of the enzymes named, being taken as a typical representative. The fact that this preparation appears to gain ground but slowly in England as a medicine seems to be due to the uncertainty which exists as to the destruction of the enzymes when it is taken by the mouth. The author's experience was that several well-known physicians prescribed it regularly, with alkalies and aromatics as well as alone, without keratin

coating, from which he concludes that the good results which apparently accrued were due to its proteolytic property, since the action of the trypsin would not be destroyed so long as the medium did not contain above 0.5 per cent. of acid.

The characters and tests applied to pancreatin in the last edition of the U. S. P. are, in the author's experience, not a success. He has never met with a single sample which was odorless or completely soluble in water. He has been accustomed to use the following modification of the U. S. P. test: The milk and most of the water, with the soda dissolved in it, is raised to a temperature of  $52.5^{\circ}$  C.—which temperature he regards as being the most favorable to digestion—when the pancreatin, previously mixed with the remainder of the water, is added, the whole being maintained at the temperature named, until a measured sample tested from time to time no longer produces a coagulum with a measured quantity of acid. The time required is then noted, and a comparison may thus be established between samples. No sample has been examined complying with the U. S. P. test, which the author regards as too stringent. He considers that the test might be improved by ascertaining the power of starch digestion of a sample, e. g., "should digest 100 times its weight in 30 minutes."—Pharm. Jour., Mar. 7, 1896, 194-195; from Proc. Chem. Assist. Assoc., London, Febr. 27, 1896.

*Gelatin—Permanent Liquefaction.*—A. Dastre and N. Floresco find that under certain conditions hot solutions of gelatin remain fluid on cooling. This loss of the power of gelatinization may be caused by the prolonged and repeated action of boiling water on gelatin, or by saline solutions, and also by the fermentive action of certain microbes. The product of change is named by the authors

*Gelatose or Paragelatose*, which is characterized by its inability to gelatinize, non-precipitation in the presence of sodium chloride, and the entrance of water into its composition, that liquid having combined with the gelatin to form gelatose. The microbes that are concerned in the formation of gelatose are the same as those that are distinguished by their power of liquefying culture media. The "saline digestion" strongly resembles that caused by gastric and pancreatic ferments, the transformation of gelatin into gelatose being readily effected by the use of 10 per cent. solutions of certain neutral salts, such as alkali iodides and chlorides.—Pharm. Journ., Nov. 30, 1895, 454; from Compt. rend., cxxi., 615.

#### URINARY AND BILIARY COMPOUNDS.

*Urine—Rapid Filtration.*—A writer in "Medical and Surg. Reporter" communicates the following plan for rapidly and conveniently filtering small quantities of urine to be tested for albumen. A small quantity of the cloudy urine is placed into a test tube, and the mouth of the tube is

plugged with cotton moderately firm. A second tube is placed with its mouth to the first, and the position of the tubes is now reversed, the plugged tube being uppermost. Upon applying carefully and gently the flame of a Bunsen burner or alcohol lamp to the upper tube, the expansion of the air above the urine immediately forces it through the cotton plug, and the filtered urine collects in the lower tube.—Amer. Drugg., Nov. 11, 1895, 279.

*Urinary Sediment—Method of Preservation for Microscopic Examination.*—Pollaci proposes the following method for preserving urine sediment indefinitely in an unaltered form for microscopic examination. Allow the sediment to form in the urine as usual and decant the supernatant urine. To the sediment add sufficient

*Hayem's fluid*—prepared by dissolving 0.5 mercuric chloride, 1.0 sodium chloride and 1.0 sodium sulphate in 200.0 distilled water—to cover it, and stir well so as to mix the liquid thoroughly with the sediment. After 24 hours wash the sediment thoroughly with distilled water. Epithelial cells, cylindrical casts, leucocytes and red corpuscles retain their form unchanged, and the sediment may be mounted as wanted, either as an uncolored or a stained preparation, the staining being effected by saturated aqueous methylene blue solution after allowing the sediment to dry on the cover glass; then mount in damar varnish.—Amer. Drugg., Nov. 25, 1895, 319-320; from "Riforma Medica."

*Urine—Observation of Living Nematodes in the Sediment.*—Van Ledden-Hulsebosch, during a recent examination of urine, which was of apparently normal character, was surprised to observe in the insignificant deposit, minute eel-like organisms, which he identified to be *Filaria Bancrofti*, Cobold. Both male and female specimens were observed, and are shown in illustration. Their length assayed 0.477 Mm., their diameter 0.0125 Mm., the male being distinguished by a small hook-shaped attachment near the posterior end.—Pharm. Centralh., July 25, 1895, 421-422.

*Urine—Influence of Certain Medicinal Compounds upon its Character.*—Frederick W. Haussmann communicates some interesting observations respecting the influence of certain medicinal compounds upon the character of the urine passed, the most frequent effect being the property of such urine responding to one or the other of the tests usually employed for the recognition of glucose. It is true that normal urine possesses the property of responding feebly to a number of reactions for glucose, some of which are probably due to a glycuronic compound—indoxyl glycuronic acid—which is stated to exist in it; but under the influence named, these reactions become decided. Thus, in urine passed after the administration of

*Chloral Hydrate*, the Moore-Heller reaction, and the reducing action upon Fehling's solution manifest themselves, while to Böttger's bismuth test the urine will not respond. In

*Croton Chloral Urine*, the reducing action upon Fehling's solution is slight ; but

*Chloroform Urine* will also reduce Fehling's solution.

*Turpentine Urine* will also respond to the commonly employed reactions for grape sugar, and is not infrequently found to respond readily to albumen tests. This may be due to a temporary albuminuria produced by this drug, which disappears with the suspension of the drug, but the reaction may also be due to the appearance of so-called resin acids, which manifest themselves upon the application of certain tests for albumen.

*Copaiba* and its oil behave similarly to oil of turpentine when the urine is examined for albumen and for glucose.

*Acetanilid Urine* reduces Fehling's solution and responds to most other sugar tests, while

*Chrysophanic Acid Urine*, voided after the administration of rhubarb and senna, may also lead to error, inasmuch as it gives, in a feeble way, reactions with certain glucose reagents.—*Amer. Journ. Pharm.*, Feb. 1896, 84-95.

*Urine—Sensitive Albumen Reagent.*—Dr. A. Jolles characterizes an albumen reaction that is useful in all cases of urine examination as follows : The reagent must be colorless, and the reaction must be so sensitive as to enable by differentiation the detection of quantities so small that they can no longer be determined quantitatively : as distinct traces, traces, or faint traces. The delicacy of the reaction must, in fact, be so great that in case of negative results the absence of pathological albumen traces may be absolutely accepted as proven ; moreover, the utility of the reagent must be absolutely independent of the composition of the urine. The two reactions which the author has hitherto found the most useful and reliable are the *acetic acid-ferrocyanide test* and that with *Spiegler's reagent*—solution of corrosive sublimate, 81 ; tartaric acid, 4 ; and cane sugar, 20 ; in water, 200—but neither of them responds to all the demands cited, and he therefore recommends the following which meets them all : Corrosive sublimate, 1.0 ; succinic acid, 2.0 ; sodium chloride, 1.0 ; distilled water, 50. The test is made by mixing 4 to 5 Cc. of the filtered urine with 1 Cc. of 30 per cent. acetic acid, adding 4 Cc. of the reagent, and shaking. A comparison test is made by using urine and acid in the same quantities, but adding 4 Cc. of distilled water in place of the reagent. On comparing the two fluids, the faintest traces of albumen (1 : 120,000) are distinctly visible in that to which the reagent has been added.—*Pharm. Centralh.*, Feb. 6. 1896, 77 ; from *Ztschr. Physiol. Chem.*, 1895, 306.

*Urine—Tests for Indican Present in Abnormal Quantities.*—F. W. Haussmann has studied the pathological import of indican in quantities above the normal in urine, and makes some practical observations respecting the tests that are usually employed for its presence. The amount of indican present in urine under normal conditions, in the language of Neubauer

and Vogel, is augmented with the increased decomposition of albuminous compounds (in the intestines and elsewhere) and in the most favorable conditions for its absorption into the blood. Indican is therefore found in all normal urine, in minimum quantity after vegetable diet, in maximum amount after albuminous or meat diet. In pathological conditions the putrefaction of the intestinal contents has a tendency to increase the excretion of urine, and the condition of intestinal torpor produced in the course of indicanuria in a number of disorders of the gastro-intestinal tract.

*Indican*, or urine indigo, has been described under a number of names, such as cyanurin, uroglaucin, urodin, urocyanin, purpurin, urine blue, etc.; but was identified by Hassal and Sicherer as indigo. The mother substance, *indol*, is produced during the pancreatic digestion of albuminous compounds; this is further oxidized into oxide of indol, or *indoxyl*, and it exists in the urine, according to Baumann, in the form of *indoxylsulphuric acid*. As a rough test for indican, Heller's is still employed to a large extent. This test, in the author's experience, is rendered more delicate by the following modification: To 4 or 5 Cc. of chemically pure hydrochloric acid add 2 or 3 drops of 10 per cent. solution of potassium nitrate, and drop 10 to 20 drops of urine into this mixture, noting the color after each addition. The violet or blue color will soon develop in the presence of abnormal quantities of indican, whereas in the presence of normal quantities of indican a pale yellowish red is produced. The color produced by the modified test will generally fade upon standing some time, owing to the bleaching effect of the nitrous oxide developed; but the test is considerably more delicate than Heller's original test in which potassium nitrate is not used, and is preferable to the modification in which pure nitric acid is used. For dark-colored urine, voided under certain pathological conditions, treatment of the urine with basic lead acetate to precipitate the coloring matter, and precipitation of the excess of lead by sulphuric acid, is recommended, this treatment furnishing an almost colorless filtrate to which Jappe's test, as the most delicate for indican, may then with advantage be applied. This consists in adding to 30 Cc. of the urine an equal volume of pure hydrochloric acid, adding to this a few Cc. of chloroform, and then, drop by drop, a freshly prepared solution of chlorinated lime, shaking the mixture after each addition, and watching carefully when the greatest depth of blue makes its appearance. The chloroform layer, on separation, will have a blue or violet color in presence of abnormal quantities of indican. Mr. Haussmann observes that to make this test successfully the chlorinated solution must be added as directed, drop by drop, and an excess must be avoided, else the indican will be oxidized to the colorless isatin. In the presence of albumen, also, this must be first removed by coagulation and filtration. In case the urine voided is from patients taking iodides, the iodine in the urine must be re-

moved by test solution of silver nitrate before mixing the urine with the hydrochloric acid. The author also calls attention to Weber's test, which does not, however, appear to have any advantage over the last named.—*Merck's Report*, Nov. 15, 1896, 460-462.

*Urine—Substances Interfering with Nylander's Reagent for Sugar.*—R. Glan enumerates the following substances that may interfere with the determination of sugar in urine by Nylander's reagent: Physiological constituents of the urine, when present in larger quantities: kreatin, uric acid, indican, uroerythrin, (milk sugar); pathological substances, besides glucose: albumen (only in larger quantities), pentose, maltose; medicinal agents: rhubarb, senna, kairin, eucalyptus, oil of turpentine, quinine (in large doses), chloral hydrate, trional, sulfonal, salol. There are doubtless many other substances, particularly medicines, that may be found to give reactions similar to that given by sugar with Nylander's reagent. While, therefore a negative result with this reagent may be taken as an absolute proof of the absence of glucose, a positive reaction should always be confirmed by other reactions or methods, and particularly by the fermentation method.—*Pharm. Centralh.*, Aug. 15, 1895, 459; from *D. Med. Zeit.*, 1895, 689.

*Urine—Precautions in Testing for Sugar.*—Sir W. Roberts comments upon the uncertainty in testing for sugar in urine, the reduction by Fehling's solution not always being due to sugar. To make perfectly sure he strongly advocates preliminary filtration of the sample three times through purified animal charcoal. This decolorizes the urine and completely removes the uric acid and urates, whereby the urine is brought to a peculiarly favorable condition for giving a clear and definite response to the copper test: Charge the test-tube with Fehling's solution to the depth of a quarter of an inch, add the filtrate to the depth of about 2 inches, thoroughly mix and apply the flame to the upper half of the liquid, and briskly boil for a couple of seconds. If the tube is held up to the light, when sugar is present the upper half is soon seen to lose its blue color and assume a yellowish tinge, and with minimal quantities of sugar the yellowish tinge is but slowly developed.—*Chem. and Drugg.*, April 18, 1899, 559; from "Practitioner."

*Urine—New Reagent for Acetone and for Uric Acid.*—It is stated in *Rep. de Pharm.* (1895, 323), that if 5 or 10 drops of a 5 per cent. solution of *Dimethylparaphenylenediamine* are added to a dilute solution of acetone, a violet color is produced, which changes to a rose-red, and on the next day to a decided red color. If the urine is evaporated to complete dryness with concentrated nitric acid, and a few drops of the same reagent are added, a wonderfully handsome blue color with a violet tinge is produced. This reaction is as good as the well-known murexid reaction.—*Pharm. Centralh.*, Oct. 24, 1895, 616.

*Urine—New Method of Estimating Uric Acid.*—Krueger publishes a new method for the determination of uric acid, which depends upon its precipitation, and of the alloxin bases, by copper sulphate in combination with sodium bisulphite: Heat 100 Cc. of the urine to the boiling point, add 10 Cc. of sodium bisulphite solution and 10 Cc. of copper sulphate solution (13 per cent.). Then add 5 Cc. of a ten per cent. solution of barium chloride, boil for three minutes, and then allow to stand for two hours. Filter the liquid, wash the precipitate thoroughly with hot water, and determine the nitrogen in the precipitate—which represents both the uric acid and the alloxin bases—by Kjeldahl's process. Then add to a second portion of 100 Cc. of the urine sodium carbonate until a flocculent precipitate is produced, and add 5 Cc. of 10 per cent. acetic acid in order to liberate the uric acid. Now add half a gramme of manganic oxide, prepared in the wet way, and boil moderately for a quarter of an hour. Neutralize with sodium carbonate, and digest the mixture with 10 Cc. of sodium bisulphite solution until the major portion of the manganic oxide is dissolved as manganese sulphate. Add 10 Cc. of the copper sulphate solution and 5 Cc. of barium chloride solution; boil for three minutes and allow to stand for two hours. Treat the resulting precipitate the same as directed above, and estimate the nitrogen as before. This gives the nitrogen of the alloxin bases, which when deducted from the total previously ascertained, gives the amount representing the uric acid in the sample.—*Amer. Drugg.*, April 25, 1896, 248; from *Zeitschr. f. physiol. Chem.*, 1896.

*Uric Acid—Conditions affecting its Solubility in Urine.*—Smale finds that uric acid is soluble in water in the proportion of 1 : 2400; less soluble in solutions of sodium chloride, and decreasing in proportion to its greater concentration. Urea increases its solubility and reduces the precipitation by hydrochloric acid. Its solubility in neutral sodium phosphate solution is decidedly large, whilst it is decreased in acid sodium phosphate solutions, so that uric acid in saturated solutions may be almost completely precipitated by monosodium phosphate.—*Pharm. Centralh.*, Jan. 2, 1896, 9; from *Centralbl. f. Physiol.* 1895, 385.

*Uric Acid—Bacterial Fermentation.*—E. Gérard has been able to decompose uric acid into urea and ammonium carbonate by the action of micro-organisms. A solution of the acid and of disodium phosphate after exposure to the air for four days was rendered turbid by micro-organisms which had been attracted, and the presence of free ammonia was indicated. Variations in the products of the bio-chemical action seemed to indicate that if the action were allowed to continue, the urea would in time probably be decomposed, and ammonium carbonate be the sole product.—*Pharm. Journ.*, May 30, 1896, 121; from *Compt. rend.*, cxxii., 1019.

*Urea—Improved Method of Determination by the Hypobromite Process.* Alfred H. Allen observes that in the ordinary way of employing the hypo-



bromite process for the determination of urea, the evolution of nitrogen in the form of gas, as is well known, is only about 92 per cent. of the total nitrogen present. An increased yield of nitrogen is obtainable by adding glucose, and by certain other devices, but these modifications are open to several objections, and have not met with general acceptance. He now offers an improved method which is based upon the observation of Walker and Hambly that ammonium cyanate is completely converted into urea, and that the reverse reaction occurs when an aqueous solution of urea is boiled, but that a solution containing both ammonium cyanate and urea ultimately arrives at a condition of equilibrium, which is upset if ammonium sulphate or potassium cyanate be added to the solution, the urea in each case being rendered more stable. It appeared probable, therefore, that the incomplete evolution of nitrogen in the hypobromite process of determining urea might be due to a reversion of a portion of the urea to the condition of cyanate, but that by adding a sufficiency of potassium cyanate—which evolves no gas by the addition of alkaline hypobromite—before adding the hypobromite, the reversion of the urea to cyanate might be entirely prevented. Experiment has proved this conjecture to be correct, and the author, therefore, suggests the following process, in which, also, the usual mode of procedure is reversed, as originally suggested by J. R. Duggan. A convenient arrangement for the reversed form of the process is described in the author's work on the "Chemistry of Urine." In this apparatus a separatory funnel is substituted for the sample-tube generally used. Five Cc. of the urine or other solution of urea is placed in the flask, and 0.250 Gm. potassium cyanate added. When solution is complete, 25 Cc. of a 40 per cent. aqueous solution of caustic soda is added, the separator adjusted, and the flask connected with a nitrometer. A solution of 2 Cc. of bromine in 16 Cc. of 20 per cent. solution of potassium bromide is then added gradually, from the tapped separator. The evolution of nitrogen occurs very promptly, and is usually completed by the time one-half of the prescribed volume of bromine solution has been added. The yield of nitrogen under these conditions is from 99.8 to 100.0 per cent. of that contained in the urea.—Chem. News, Feb. 28, 1896, 103-104.

*Urea—New Synthesis by the Interaction of Guaiacol Carbonate and Ammonia.*—P. Cazeneuve finds that the guaiacol carbonate of Heyden, in contact with alcohol saturated with ammonia gas, is rapidly converted in the cold into urea and guaiacol. The process is accelerated by heating. The urea is obtained in long needles on evaporating the greenish solution formed, and can be purified by recrystallization from alcohol.—Pharm. Jour., May 30, 1896, 421; from. Compt. rend., cxxii., 999.

*Hydrobilirubin—Determination in Fæces.*—According to Ad. Schmidt, the addition of freshly-passed fæces to a watery solution of corrosive sublimate causes a more or less intense red coloration, which is due to the

reaction of mercuric chloride upon the hydrobilirubin present in the fæces as a reduction product of

*Bilirubin*.—The method is very useful in clinical examinations, because the mercuric chloride also shows the presence of bilirubin, which produces a distinct green color sharply separated from the red-colored particles of tissues containing the hydrobilirubin.—Pharm. Centralh., Feb. 13, 1896, 96 ; from D. Med. Wochenschr., 1896, No. 4.

# APPENDIX.

## LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE FORTY-FOURTH ANNUAL MEETING, HELD AT  
MONTREAL, CANADA, WITH THE NAMES OF THEIR  
PRESIDENTS AND SECRETARIES.

### COLLEGES OF PHARMACY.

<i>Name.</i>	<i>President.</i>	<i>Secretary.</i>
Albany .....	Jos. W. Russell .....	De Baun Van Aken.
Brooklyn .....	Wm. Muir .....	Flavel N. Bliss.
Cleveland .....	E. A. Schellentrager .....	Joseph Feil.
Chicago .....	A. S. Draper .....	W. L. Pillsbury.
Louisville .....	M. C. Peter .....	G. L. Curry.
Kansas City .....	A. Breunert .....	F. D. Mitchell.
Maryland .....	Louis Dohme .....	E. Baldwin Fischer.
Massachusetts .....	J. G. Benedict .....	W. D. Wheeler.
Montreal .....	W. H. Chapman .....	E. Muir.
National .....	F. M. Criswell .....	W. H. Bradbury.
New Jersey .....	Chas. Menk .....	J. F. Sommerhoff.
New York .....	Edw. Kemp .....	A. H. Mason.
Ontario .....	Jas. H. Mackenzie .....	I. T. Lewis.
Philadelphia .....	Chas. Bullock .....	W. B. Thompson.
St. Louis .....	Chas. Gietner ..	J. C. Falk.

### SCHOOLS OF PHARMACY.

Northwestern University .....	Oscar Oldberg, <i>Dean.</i>
Purdue University .....	Arthur L. Green, <i>Dean.</i>
University of Kansas .....	Lucius E. Sayre, <i>Dean.</i>
University of Michigan .....	A. B. Stevens, <i>Secretary.</i>

### STATE PHARMACEUTICAL ASSOCIATIONS.

	<i>President.</i>	<i>Secretary.</i>
Colorado .....	H. Reynolds .....	C. E. Ward.
Connecticut .....	C. P. Gladding .....	A. S. Clark.
Delaware .....	G. Y. Foulk .....	F. W. Fenn.
Georgia .....	I. A. Solomons .....	C. T. King.
Florida .....	J. A. Conover .....	H. C. Cushman.
Illinois .....	G. H. Sohrbeck .....	Frank Fleury.
Indiana .....	W. O. Gross .....	A. Timberlake.
Indian Territory .....	L. L. Moore .....	E. P. White.
Kansas .....	W. J. Evans .....	Mrs. M. O. Miner.

Kentucky .....	R. M. McFarland .....	J. W. Gayle.
Louisiana .....	P. L. Viallon .....	Mrs. E. Rudolf.
Maine .....	Geo. W. Dorr .....	M. L. Porter.
Maryland .....	H. B. Gilpin .....	Henry Maisch.
Massachusetts .....	W. F. Sawyer .....	Jas. F. Guerin.
Minnesota .....	E. C. Dorr .....	C. T. Heller.
Missouri .....	Eugene Soper .....	H. M. Whelpley.
Nebraska .....	J. J. Teten .....	W. L. Heilman.
New Jersey .....	H. O. Ryerson .....	Geo. T. Fitzgeorge.
New York .....	R. M. Smither .....	J. B. Todd.
North Carolina .....	Aug. Bradley .....	H. R. Horne.
North Dakota .....	Geo. A. Day .....	W. S. Parker.
Nova Scotia .....	F. C. Simson .....	A. H. Buckley.
Ohio .....	Jno. A. Mayer .....	L. C. Hopp.
Pennsylvania .....	J. P. Remington .....	J. A. Miller.
Province of Quebec .....	R. W. Williams .....	E. Muir.
Rhode Island .....	M. B. Wood .....	W. E. Cates.
South Carolina .....	O. E. Thomas .....	J. A. Barbot.
South Dakota .....	W. S. Branch .....	I. A. Keith.
Tennessee .....	G. C. Childress .....	R. W. Vickers.
Virginia .....	W. G. Burgess .....	C. B. Fleet.
Wisconsin .....	F. W. Thieman .....	E. B. Heimstreet.

## ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

	<i>President.</i>	<i>Secretary.</i>
Chicago .....	J. A. Lydston .....	A. D. Thorburn.
Maryland .....	Chas. Schmidt .....	Paul Caldwell.
Philadelphia .....	J. L. D. Morison .....	W. E. Krewson.
St. Louis .....	Theo. F. Hagenow .....	L. A. Seitz.

## COUNTY AND CITY ASSOCIATIONS.

	<i>President.</i>	<i>Secretary.</i>
Kings County .....	William Muir .....	F. N. Bliss.

## NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

J. C. Eliel, <i>President</i> .....	A. B. Merriam, <i>Secretary</i> .
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## LIST OF MEMBERS IN ATTENDANCE AT MONTREAL.

Names of delegates indicated by \*.

- Abernethy, M., Jersey City, N. J.  
 \*Alpers, Wm. C., Bayonne, N. J.  
 \*Baridon, L. R., Montreal, Can.  
 Bartells, Geo. C., Camp Point, Ill.  
 Bartley, Elias H., Brooklyn, N. Y.  
 Beal, James H., Scio, O.  
 Berryhill, H. P., Connellsville, Pa.  
 Betzler, Jacob, Newark, N. J.  
 Boynton, H., Biddeford, Me.  
 \*Burge, James O., Nashville, Tenn.  
 \*Butler, F. H., Lowell, Mass.  
 \*Caspari, Chas., Jr., Baltimore, Md.  
 \*Cates, Wm. E., Providence, R. I.  
 \*Chapman, W. H., Montreal, Can.  
 \*Crampton, F. L., Kansas City, Mo.  
 Clafin, W. A., Cambridge, Mass.  
 \*Coblentz, Virgil, New York, N. Y.  
 Cook, Thomas P., New York, N. Y.  
 D'Avignon, J. Eug., Windsor, Can.  
 D'cary, A., Montreal, Can.  
 Dewoody, W. L., Pine Bluff, Ark.  
 \*Diehl, C. Lewis, Louisville, Ky.  
 \*Dohme, Chas. E., Baltimore, Md.  
 \*Dorr, George W., Waterville, Me.  
 \*Drury, Linus D., Boston, Mass.  
 \*Earl, Noble C., Portland, Me.  
 \*Ebert, Albert E., Chicago, Ill.  
 Eichrodt, Chas. W., Indianapolis, Ind.  
 Faber, F. W., St. Paul, Minn.  
 Fennel, Chas. T. P., Cincinnati, O.  
 Fenner, A. W., Providence, R. I.  
 \*Firmin, John C., Findlay, O.  
 \*Frost, Wm. A., St. Paul, Minn.  
 \*Good, James M., St. Louis, Mo.  
 \*Hallberg, C. S. N., Chicago, Ill.  
 \*Hardin, John H., Wilmington, N. C.  
 Hartnett, Eugene, Jersey City, N. J.  
 Hassebrock, H. F., St. Louis, Mo.  
 \*Hay, Edw. A., Portland, Me.  
 \*Hechler, Geo. I., Cleveland, O.  
 Hedley, Thomas A., Boston, Mass.  
 Helfman, Joseph, Detroit, Mich.  
 \*Hereth, Frank S., Chicago, Ill.  
 Holzhauer, Chas., Newark, N. J.  
 Hopp, Lewis C., Cleveland, O.  
 \*Husted, Alfred B., Albany, N. Y.  
 Jelliffe, S. E., M. D., New York, N. Y.  
 Kebler, Lyman F., Philadelphia, Pa.  
 \*Kellam, C. R. J., Heron Lake, Minn.  
 \*Kennedy, Geo. W., Pottsville, Pa.  
 Kremers, Edward, Madison, Wis.  
 \*Lachance, S., Montreal, Can.  
 Lampa, R. R., New York, N. Y.  
 Lancot, Henri, Montreal, Can.  
 Lander, John C., Toronto, Can.  
 \*LaPierre, E. A., Cambridge, Mass.  
 \*Lariviere, T., Minneapolis, Minn.  
 \*Lecours, J. E. W., Montreal, Can.  
 Lloyd, John U., Cincinnati, O.  
 Lyons, F. W., Jersey City, N. J.  
 \*Macmillan, Alex. M., Montreal, Can.  
 \*MacRae, John Y., Raleigh, N. C.  
 \*Main, Thos. F., New York, N. Y.  
 \*Mason, Alfred H., New York, N. Y.  
 Mason, Harry B., Dannemora, N. Y.  
 \*Mayo, Caswell A., New York, N. Y.  
 \*Mennen, Gerhart, Newark, N. J.  
 Merrell, Chas. G., Cincinnati, O.  
 Miles, Henry, Montreal, Can.  
 \*Mittelbach, Wm., Booneville, Mo.  
 Morrison, Joseph E., Montreal, Can.  
 Morse, Edw. W., Mt. Vernon, Ill.  
 \*Muir, E., Montreal, Can.  
 Mulford, Henry K., Philadelphia, Pa.  
 Otis, Clark Z., Binghamton, N. Y.  
 \*Parisen, Geo. W., Perth Amboy, N. J.  
 Patch, Edgar L., Boston, Mass.  
 \*Patton, John F., York, Pa.  
 Payne, George F., Atlanta, Ga.  
 \*Peacock, Josiah C., Philadelphia, Pa.  
 Peters, John M., New York, N. Y.  
 \*Pleuge, Henry, Charleston, S. C.  
 \*Prescott, A. B., Ann Arbor, Mich.  
 Ray, Peter W., Brooklyn, N. Y.

- Reed, Thomas D., Montreal, Can.  
 Reitzka, H. W., St. Paul, Minn.  
 \*Remington, Jos. P., Philadelphia, Pa.  
 Richard, Alexander, Stillwater, Minn.  
 Richardson, H. S., Concord, Mass.  
 Ridgway, Lemuel A., Fillmore, N. Y.  
 Robinson, Edw. A., Lowell, Mass.  
 Roy, J. Emile, Quebec, Can.  
 \*Rusby, Henry H., M. D., New York, N. Y.  
 Ryan, Frank G., Philadelphia, Pa.  
 Sadtler, Samuel P., Philadelphia, Pa.  
 Saunders, William, Ottawa, Can.  
 \*Sayre, Lucius E., Lawrence, Kan.  
 \*Scherer, Andrew, Chicago, Ill.  
 \*Schimpf, Henry W., Brooklyn, N. Y.  
 \*Schoettlin, Albert J., Louisville, Ky.  
 \*Schrack, Henry C., Milwaukee, Wis.  
 \*Schuh, Paul G., Cairo, Ill.  
 Scoville, Wilbur L., Boston, Mass.  
 \*Seabury, Geo. J., New York, N. Y.  
 Serodino, Herman, Cincinnati, O.  
 \*Sheppard, Sam'l A. D., Boston, Mass.  
 \*Shumpik, Edw., Minneapolis, Minn.  
 \*Simson, Frank C., Halifax, Can.  
 Smith, E. N., Thompsonville, Conn.  
 Sprague, W. G., Flushing, Mich.  
 Staebler, Richard, Newark, N. J.  
 \*Stevens, A. B., Ann Arbor, Mich.  
 Stewart, F. E., Detroit, Mich.  
 \*Thomas, O. E., Columbia, S. C.  
 \*Trimble, Henry, Philadelphia, Pa.  
 \*Thompson, W. S., Washington, D. C.  
 Tremble, Jno. E., Montreal, Can.  
 Voss, Geo. W., Cleveland, O.  
 \*Watson, S. P., Atlanta, Ga.  
 Webber, J. LeRoy, Syracuse, N. Y.  
 \*Whelpley, Henry M., St. Louis, Mo.  
 Winter, Jonas, Hagerstown, Md.  
 Winnberg, Jno., Jamestown, N. Y.  
 \*Williams, R. W., Three Rivers, Can.  
 Wood, Mason B., East Providence, R. I.  
 \*Woodward, B. W., Lawrence, Kans.  
 \*Zoeller, E. V., Tarboro, N. C.

## LIST OF NEW MEMBERS.

- Airheart, Israel B., Lonoke, Ark.  
 Barth, George F., North Alton, Ill.  
 Blackman, Wm. M., Nashville, Tenn.  
 Blackmore, Henry S., Mt. Vernon, N. Y.  
 Bloomstein, Max, Nashville, Tenn.  
 \* Boeddiker, Otto, New York, N. Y.  
 \* Brace, William D., Washington, D. C.  
 Bradley, Frank H., Albany, N. Y.  
 Bradley, Theodore J., Albany, N. Y.  
 Furrill, John W., Auburn, Me.  
 Burton, William A., Athol, Mass.  
 Childs, William R., North Wales, Pa.  
 Christianson, Lars, Fargo, N. Dak.  
 Clafin, Walter A., Cambridge, Mass.  
 Cogan, Dennis S., Portland, Me.  
 \* Colburn, Jesse M., Little Rock, Ark.  
 Crampton, Ferd. L., Kansas City, Mo.  
 Dadd, Robert M., Milwaukee, Wis.  
 Danner, William E., Philadelphia, Pa.  
 Day, George A., Fargo, N. Dak.  
 Davis, Edward B., Nashville, Tenn.  
 Dewender, Wm. H., Brooklyn, N. Y.  
 Dorr, George W., Waterville, Me.  
 Drew, Walter I., Portland, Me.  
 Eberle, Eugene G., Dallas, Tex.  
 Getty, Wilmot S., St. Paul, Minn.  
 Goold, Joseph E., Portland, Me.  
 Grace, William D., Portsmouth, N. H.  
 Hall, Horace B., Fredericksburg, Va.  
 Harbaugh, Wilson L., Haverford, Pa.  
 Harrison, William J., Lakewood, N. J.  
 Heschong, John F., Peoria, Ill.  
 Heseltine, Daniel W., Portland, Me.  
 Hoch, Aquila, Philadelphia, Pa.  
 Howey, John J., Montreal, Can.  
 \* Humiston, Ray, Worthington, Minn.  
 Kettler, Edward, Jr., Milwaukee, Wis.  
 King, Robert B., Helena, Ark.  
 Kirk, James E., Jacksonville, Fla.  
 Knœfel, Bruno, New Albany, Ind.  
 Koch, John A., Washington, D. C.  
 Lariviere, Telesphore, Minneapolis, Minn.  
 Lauricella, Felice, Boston, Mass.  
 La Wall, Chas. H., Philadelphia, Pa.  
 Lecours, Joseph E. W., Montreal, Can.  
 Lee, Chas. J., Valley City, N. Dak.  
 Lewi, Theodore J., Albany, N. Y.  
 Linton, Chas. E., Woods, Ore.  
 Lockie, James A., Buffalo, N. Y.  
 Lohmann, Herman J., Jersey City, N. J.  
 Lowell, Edward M., Lewiston, Me.  
 Macmillan, Alex. M., Montreal, Can.  
 Maguire, Andrew H. J. M., Chicago, Ill.  
 Marelus, Chas. R., St. Paul, Minn.  
 Mason, Harry B., Dannemora, N. Y.  
 McClearn, Henry T., Portland, Me.  
 Miles, Henry, Montreal, Can.  
 Mix, Willis L., New Haven, Conn.  
 Morse, Edward W., Mt. Vernon, Ill.  
 Mulford, Henry K., Philadelphia, Pa.  
 Murphy, John S., Pontiac, Ill.  
 Murray, Benjamin L., New York, N. Y.  
 Offutt, Willard C., Savannah, Ga.  
 Page, David S., Nashville, Tenn.  
 Parks, John K., Woodford, Me.  
 Peters, John M., New York, N. Y.  
 Priest, Carlton R., Princeton, N. J.  
 Reed, Thomas D., Montreal, Can.  
 Richard, Alexander, Stillwater, Minn.  
 Richardson, Frank, Albany, N. Y.  
 Robertson, Peter, Newberry, S. C.  
 Roy, J. Emile, Quebec, Can.  
 Sawyer, Chas. H., Saco, Me.  
 Schlotterbeck, Aug. G., Portland, Me.  
 Schroeder, John H., Cincinnati, O.  
 \* Shumpik, Edward, Minneapolis, Minn.  
 Stamm, Dante M., Geneseo, Ill.  
 Stewart, Andrew M., Tacoma, Wash.  
 Thiemann, John H., Jr., Louisville, Ky.  
 Thomas, James, Nashville, Tenn.  
 Townsend, James V., Atlantic City, N. J.  
 Tremble, John E., Montreal, Can.  
 Trevitt, Cleophas A., Rome, Ga.  
 Troxler, Constantine, Jr., Louisville, Ky.

\* Elected in 1895, but name received too late for publication in last volume of Proceedings.

Watt, George H., Pullman, Wash.  
Watters, Henry, Ottawa, Can.  
Webb, David C., Forrest City, Ark.  
Weida, Chas. A., Reading, Pa.  
Wescott, William C., Atlantic City, N. J.

Wilbur, Lot, Snohomish, Wash.  
Wilson, John E., Walnut Ridge, Ark.  
Wingate, Frank H., Sanford, Me.  
Wittmer, Joseph W., Dubuque, Ia.



## LIST OF LIFE MEMBERS.

PUBLISHED IN ACCORDANCE WITH RESOLUTIONS OF THE COUNCIL.

SEE PROCEEDINGS 1888, PAGE 41.

[Names of Life Members under the Old Constitution in *Italics*; under the present By-Laws, in SMALL CAPITALS.]

*Abernethy, Maxwell.*  
 BAYLEY, AUGUSTUS R.  
*Berrian, Geo. W.*  
 BIROTH, HENRY.  
*Blatchford, Eben.*  
 BORING, EDWIN M.  
 BUCK, JOHN.  
*Bullock, Charles.*  
 CALDER, ALBERT L.  
 CANDIDUS, PHILIP C.  
 CANNING, HENRY.  
*Cummings, Henry T.*  
*Dearborn, George I.*  
 DOHME, LOUIS.  
*Doliber, Thomas.*  
 DRAKE, JOHN R.  
 DRURY, LINUS D.  
*Dupuy, Eugene.*  
 EBERT, ALBERT E.  
 ELLIOTT, HENRY A.  
*Ellis, Evan, T.*  
 FOUGERA, EDMUND C. H.  
 FULLER, OLIVER F.  
*Gale, Edwin O.*  
*Gale, William H.*  
*Goodwin, Wm. W.*  
*Gordon, Wm. J. M.*  
*Grahame, Israel F.*  
 GRIFFITH, ALBERT R.  
 GROSSKLAUS, JOHN F.  
 HANCE, EDWARD H.  
 HARLOW, NOAH S.  
*Haviland, Henry.*  
 HEINTISH, CHARLES A.  
*Heintzelman, Joseph A.*  
*Heyl, James B.*  
 HOLZHAUER, CHARLES.  
*Hudnut, Alexander.*

JACQUES, GEORGE W.  
*Jenks, Wm. F.*  
*Kent, Robert R.*  
 KING, JAMES T.  
 KLUSSMANN, HERMANN.  
 LAND, ROBERT H.  
 LEE, JAMES A.  
*Leitch, Arthur.*  
 LEMBERGER, JOSEPH L.  
 LLEWELLYN, JOHN F.  
*McConville, Thomas A.*  
*McPherson, George.*  
*Mellor, Alfred.*  
 MEYER, CHRISTIAN F. G.  
 MILHAU, EDWARD L.  
 MILLER, ADOLPHUS W.  
*Moffit, Thomas S.*  
*Moith, Augustus T.*  
*Molwitz, Ernest.*  
 MOORE, GEORGE.  
 MOORE, JOACHIM B.  
*Newman, George A.*  
*Ollif, James H.*  
 ORNE, JOEL S.  
 OWENS, RICHARD J.  
*Paine, James D.*  
*Parr, John C.*  
*Patten, I. Bartlett.*  
*Peabody, William H.*  
*Perot, T. Morris.*  
 PETTIT, HENRY M.  
 PFINGST, FERDINAND J.  
*Plummer, David G.*  
*Rano, Charles O.*  
 RAMSPERGER, GUSTAVUS.  
 REMINGTON, JOSEPH P.  
*Rittenhouse, Henry N.*  
 ROBINSON, JAMES S.

*Rollins, John F.*  
ROSENGARTEN, MITCHELL G.  
*Russell, Eugene F.*  
SANDER, ENNO.  
SAUNDERS, WILLIAM.  
SEABURY, GEORGE J.  
*Sharp, Alpheus P.*  
SHEPPARD, SAMUEL A. D.  
SHINN, JAMES T.  
SIMMS, GILES G. C.  
SLOAN, GEORGE W.  
*Snyder, Ambrose G.*  
SQUIBB, EDWARD R.  
STACEY, BENJAMIN F.  
*Sweeney, Robert O.*  
*Taylor, Alfred B.*  
*Thompson, William B.*

TUFTS, CHARLES A.  
*Turner, T. Larkin.*  
*Vernor, James.*  
*Wardell, Robert C.*  
*Warner, William R.*  
WELLCOME, HENRY S.  
WHITE, AARON S.  
WHITFIELD, THOMAS.  
WHITNEY, HENRY M.  
*Wiegand, Thomas S.*  
WILSON, BENJAMIN O.  
WINKELMANN, JOHN H.  
WINTER, JONAS.  
WOLTERS DORF, LOUIS.  
YORKSTON, MATTHEW M.  
ZEILIN, J. HENRY.

## GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

### SECTIONS APPLICABLE TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

#### CLASS 3, SOCIETIES, BENEVOLENT, EDUCATIONAL, ETC.

SEC. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgment of deeds in the District, and file in the office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and object of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

SEC. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same, and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

SEC. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business; and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

SEC. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed; and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

SEC. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows: whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that purpose, the proceedings of which meeting shall be duly entered in the records of the

corporation; said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

*Approved 5 May, 1870, c. 80, v. 16, pp. 98-116—Revised Statutes of the United States, relating to the District of Columbia.*

## CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Whereas, we, the undersigned, desire to form an association having for its object to unite the educated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

*First*, The corporate name of the association is the American Pharmaceutical Association.

*Second*, This association shall continue until dissolved by the action of its members, or by the operation of law.

*Third*, The objects and business of said association are as follows:

*a.* To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

*b.* To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

*c.* To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

*d.* To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

*e.* To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

f. To uphold standards of authority in the education, theory and practice of Pharmacy.  
 g. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

*Fourth*, The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1837.

Signed :	JOHN U. LLOYD,	MAURICE W. ALEXANDER,
	ALEX. K. FINLAY,	KARL SIMMON,
	SAMUEL A. D. SHEPPARD,	JOHN M. MAISCH,
	JAMES VERNOR,	C. LEWIS DIEHL,
	WILLIAM H. ROGERS,	WM. SAUNDERS,
	ALBERT E. EBERT,	PHILIP C. CANDIDUS,
	GEORGE W. KENNEDY,	ALBERT H. HOLLISTER,
	JAMES M. GOOD,	LEWIS C. HOPP,
		WILLIAM DUPONT,

Members of the Council,  
 And

JOHN A. MILBURN,	G. G. C. SIMMS,
E. B. BURY,	Z. W. CROMWELL,
W. S. THOMPSON,	JOHN R. MAJOR,
CHARLES CHRISTIANI,	W. G. DUCKETT,
A. J. SCHAFHIRT,	GEO. W. BOYD,
O. H. COUMBE,	HENRY A. JOHNSTON,
GEO. B. LOCKHART,	W. C. MILBURN,
T. C. MURRAY,	ARTHUR NATTANS,
JOSEPH R. WALTON,	THOMAS M. WEHRLY,

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1838, at 1:05 P. M., and  
 recorded in Liber No. 4, fol. 302, Acts of Incorporation, District  
 of Columbia, and examined.

Signed :

JAMES M. TROTTER, *Recorder*.

SEAL :  
 { Office of Recorder of Deeds, }  
 { District of Columbia, }  
 { Washington, D. C. }

# CONSTITUTION AND BY-LAWS

OF THE

## AMERICAN PHARMACEUTICAL ASSOCIATION.

### CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulterations.

2. To encourage such proper relations among Druggists, Pharmacists, Physicians, and the people at large, as may promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a General Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom shall be elected annually; also a Local Secretary to be elected by the Council. They shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

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## BY-LAWS.

### CHAPTER I.

#### *Of the President and Vice-Presidents.*

ARTICLE I. The President shall preside at all general sessions of the Association, except those of the special Sections, as hereinafter provided. In the event of his absence or inability to serve, one of the Vice-Presidents, or in the absence of all a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. At the sessions the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all balloting, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in case where he prefers to submit the matter to the members; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, not provided for in the By-Laws or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

## CHAPTER II.

*Of the General Secretary.*

ARTICLE I. The General Secretary shall be elected annually and shall receive from the Treasurer an annual salary of \$750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE II. He shall keep fair and correct minutes of the proceedings of the general sessions, and carefully preserve, on file, all reports, essays, and papers of every description presented to the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Report of the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every standing and special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act. He shall notify every member at least two weeks in advance of the time and place of each annual meeting.

## CHAPTER III.

*Of the Local Secretary.*

ARTICLE I. The Local Secretary shall reside at or near the place where the next annual meeting of the Association is to be held.

ARTICLE II. He shall assist the General Secretary in his duties; shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

ARTICLE III. An exhibition of objects interesting to pharmacists, may be held each year, should the Council so determine, under the direction of the Local Secretary and the Committee on Commercial Interests.

## CHAPTER IV.

*Of the Treasurer.*

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the General Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual dues for three years.



ARTICLE IV. He shall present a statement of his accounts at each annual meeting of the Council, that they may be audited; he shall receive an annual salary of \$750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of \$5,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or a Trust Company acceptable to the Council.

## CHAPTER V.

### *Of the Reporter on the Progress of Pharmacy.*

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual salary of \$750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the General Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the General Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions; together with such statistical and biographical notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting, unless such meeting is held previous to August 1.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the General Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

## CHAPTER VI.

### *Of the Council.*

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which is empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by vote of the Council, be permitted to speak on any subject under discussion.

ARTICLE II. The Council shall consist of twenty-one members, nine of whom, selected from such members as have had at least three years' membership in this Asso-

ciation, shall be elected by ballot by the Association in the following order: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years. None but *ex-officio* members of the Council shall be eligible for re-election thereto until one year after the expiration of their term of office.

ARTICLE III. The President, Vice-Presidents, General Secretary, Local Secretary, Treasurer, Reporter on the Progress of Pharmacy, the Chairmen of the Sections of the Association, and the Secretary of the Council, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and a Secretary, to be elected by ballot annually by the Council. The Secretary may or not be a member of the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section 1.* The Council shall have charge of the revision of the roll and the publication of the Proceedings.

*Section 2.* The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

*Section 3.* The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

*Section 4.* The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual Report of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sessions of the Association and of the Sections, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as it may deem worthy of insertion. It shall also fix the price at which the Proceedings may be sold.

## CHAPTER VII.

*Of Membership.*

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, subscribe to them, are eligible to membership; provided that no one, whose name has been dropped from the roll for non-payment of dues, shall be eligible for membership until payment has been made of the three years' dues for which he is in arrears.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and post the name in some suitable place in the meeting hall, near the beginning of a session: objection, if any, to be made in writing, to the Secretary of the Council, previous to the Association taking any action on the proposition. Near the close of the same, or at a subsequent session, the Association may, by vote, elect such person a member, after which his membership shall be completed by his signing the Constitution and By-Laws, and paying the annual dues for the current year.

ARTICLE III. Every member shall pay in advance to the Treasurer the sum of *Five Dollars* as his yearly contribution, and by neglecting to pay said contribution for *three successive years* he may be dropped from the Roll.

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of \$75 during the first year of his connection therewith, or after five years \$70, or after ten years \$60, or after fifteen years \$50, or after twenty years \$40, or after twenty-five years \$30, or after thirty years \$20, or after thirty-five years \$10, also any member who shall have paid to the Treasurer annual dues for thirty-seven years, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials shall be sent to the General Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, the General Secretary, and the Treasurer.

ARTICLE VII. Resignations of membership shall be made in writing to the General Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE VIII. Any member may be expelled for improper conduct, or the violation of the Constitution, By-Laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at a general session.

ARTICLE IX. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

## CHAPTER VIII.

### *Of Meetings and Sections.*

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows: 1. Section on Scientific Papers; 2. Section on Commercial Interests; 3. Section on Pharmaceutical Legislation and Education.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read the minutes of Council, act on the report of Council on membership, and receive propositions for amendments to the By-Laws.

ARTICLE V. At the third session the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fourth, fifth and sixth sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VII. At the seventh, eighth and ninth sessions the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VIII. A Chairman and a Secretary shall be elected by ballot by each Section to serve at the sessions of said Section. The minutes of each session, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the General Secretary for publication and safe-keeping.

ARTICLE IX. The Chairman of each Section shall preside at each of its sessions, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the annual meeting.

ARTICLE X. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XI. The order of business at the first session of each annual meeting shall be as follows:

*Section 1.* Promptly at the time named in the notice issued for the meeting, the President, or, in his absence, one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

*Section 2.* In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the General Secretary until his arrival.

*Section 3.* Nineteen members shall constitute a quorum for the transaction of business.

*Section 4.* The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

*Section 5.* Reports of Committees shall be presented, read by their titles, synopsis or in full, and laid on the table for future consideration.

*Section 6.* The President shall call the roll of States, the Territories, District of Columbia and the Provinces of Canada, requesting the members present from each State or Territory to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing three years; in addition to which the President shall appoint five members from the Association at large to act with the Committee. Delegates who are not members must complete their membership before they are eligible to serve on the Nominating Committee.

*Section 7.* The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, its acts shall be revised, so as to be acceptable to the Association.

*Section 8.* A committee of five on time and place of meeting shall be appointed by the President at the first session, to report at the second session.

*Section 9.* Incidental business.

ARTICLE XII. The order of business at the second general session at each annual meeting shall be as follows:

*Section 1.* The President shall call the Association to order.

*Section 2.* The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

*Section 3.* The Report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the persons nominated shall be balloted for.

*Section 4.* The Council shall present names of persons recommended for membership.

*Section 5.* Reports of Standing Committees shall be read.

*Section 6.* Reports of Special Committees shall be read.

*Section 7.* Incidental business.

ARTICLE XIII. The order of business for the sessions of the Sections shall be determined by each Section for itself.

ARTICLE XIV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XV. At the last general session of the Association the newly-elected officers of the Association shall take their respective places.

ARTICLE XVI. The Council may arrange for such social sessions, to be held after the adjournment of the last general session, as it may deem expedient, but no business of the Association can be transacted at these social sessions.

## CHAPTER IX.

*Of Committees.*

ARTICLE I. There shall be appointed or elected seven Standing Committees as follows: a Committee on Commercial Interests, a Committee on the Revision of the Pharmacopœia, and a Committee on Pharmaceutical Legislation and Education, each to consist of five members; a Committee on Scientific Papers, a Committee on the Ebert Prize, a Committee on General Prizes, each to consist of three members; and a Committee on Transportation, to consist of ten members.

ARTICLE II. The Committee on Commercial Interests shall be elected by the Section on Commercial Interests. It shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. It shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be elected by the Section on Scientific Papers. It shall arrange the business of the Section, and shall report a number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person preparing a paper for the Association which will require more than ten minutes for its reading, must accompany the same with a synopsis which can be read within ten minutes' time. The paper and synopsis must both be furnished the Committee of the particular Section to which it refers, previous to the first session.

ARTICLE V. The Committee on the Ebert Prize, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all respects it shall be governed by the stipulations expressed by the donor.

ARTICLE VI. The Committee on General Prizes, which shall be appointed by the President, shall within six months after the annual meeting, at which the papers are presented, determine which, if any of them, are worthy of prizes, and decide upon the relative merits of such papers as are deemed worthy.

ARTICLE VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. It shall report at each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. It shall arrange the business of the Section in advance of its sessions, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to it by the Section. It shall propose each year a subject for discussion at the meetings of the State Associations, and, at the following annual meeting of this Association, shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE IX. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which official and non-official remedies are used in legitimate practice,

and shall endeavor to ascertain the general wishes and requirements of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia. It shall also note errors of any kind found in the U. S. Pharmacopœia, so as to facilitate and aid the work of the National Committee on Revision of the U. S. P.

ARTICLE X. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, St. Paul, Denver and San Francisco, and in conjunction with the Local Secretary, who shall be a member of the Committee, shall arrange for transportation from the different sections of the United States and Canada to the place of meeting and return. Unless otherwise specially arranged for by the Committee, the Chairman of this Committee shall be the member residing nearest to the place of meeting.

## CHAPTER X.

### *Rules of Order and Debate.*

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the assembly and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order named. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

## CHAPTER XI.

### *Miscellaneous.*

ARTICLE I. On all points of order not covered in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-Laws shall be submitted in writing at a general session, and may be balloted for at any subsequent general session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

ARTICLE III. No one or more of these By-Laws shall be suspended.

## BY-LAWS OF THE COUNCIL.

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### CHAPTER I.

ARTICLE I. The officers of the Council shall consist of a Chairman, a Vice-Chairman and a Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

### CHAPTER II.

#### *Of the Chairman and Vice-Chairman.*

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

### CHAPTER III.

#### *Of the Secretary.*

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of \$50.

ARTICLE II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

ARTICLE III. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting of the Council.

### CHAPTER IV.

#### *Committee on Membership.*

ARTICLE I. The Committee on Membership shall consist of five members of the Council, to be elected annually by ballot. The General Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect its chairman immediately after the election of its members by the Council.



ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present to the Council the list of applicants for membership who have complied with the requirements of the By-Laws of the Association.

ARTICLE III. It shall furnish appropriate biographical sketches of deceased members for publication in the Report of the Proceedings.

ARTICLE IV. The Secretary of the Committee shall receive an annual salary of \$150.

#### CHAPTER V.

##### *Of Committee on Publication.*

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council. Immediately after its election by the Council, the Committee shall elect a Chairman.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Report of the Proceedings.

#### CHAPTER VI.

##### *Of Committee on Finance.*

ARTICLE I. The Committee on Finance shall consist of three members, who shall audit all bills of the Association, and orders of the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

#### CHAPTER VII.

##### *Of the Centennial Fund.*

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the General Secretary. It shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as it may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

## CHAPTER VIII.

*Of Sessions.*

ARTICLE I. The Council shall meet previous to the assembling of the Association, and at such other times as it may determine, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special session shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and the Secretary.
2. Election of the Standing Committees of Council, as follows:
  - a. Committee on Membership, consisting of five members of the Council, the General Secretary and the Treasurer.
  - b. Committee on Finance, three members.
  - c. Committee on Publication, five members.
  - d. Committee on Centennial Fund, three members.
3. Unfinished and deferred business from the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session of the Council shall be read and approved.

## CHAPTER IX.

*Miscellaneous.*

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at the next session of the Council, when upon receiving the vote of three-fourths of the members present, it shall become a part of these By-Laws.

## SECTION ON COMMERCIAL INTERESTS.

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### ORDER OF BUSINESS.

1. Calling the Section to order.
  2. Reading of the Chairman's Address.
  3. Reports of Committees.
  4. Reading of Papers.
  5. New Business and Discussion.
  6. Nomination and Election of Officers for the ensuing year.
  7. Installation of Officers.
  8. Reading of the Minutes.
  9. Adjournment.
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## SECTION ON SCIENTIFIC PAPERS.

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### ORDER OF BUSINESS.

#### FIRST SESSION OF THE SECTION.

1. Calling the Section to order.
2. Reading of the Chairman's address.
3. Reports of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.
4. Nominations (but not elections at this sitting) for the new officers of the Section. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.
5. Reading of Papers and discussions on the subjects brought up.
6. Adjournment.

#### SECOND SESSION OF THE SECTION.

1. Reading of Minutes of the previous Session.
2. Election of New Officers for the ensuing year.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

#### THIRD SESSION OF THE SECTION.

1. Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

## SECTION ON EDUCATION AND LEGISLATION.

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### ORDER OF BUSINESS.

#### FIRST SESSION OF THE SECTION.

1. Calling the Session to Order.
2. Reading of the Address of the Chairman.
3. Reports of Committees.
4. Nominations of Officers for the ensuing year. The election to take place at the opening of the second session.
5. Reading of Papers and Discussion.
6. Adjournment.

#### SECOND SESSION OF THE SECTION.

1. The Reading of Minutes of the previous Session.
2. The Election of Officers.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

#### THIRD SESSION OF THE SECTION.

1. The Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

## GENERAL RULES OF FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888, 1895.

*First*, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

*Second*, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

*Third*, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

*Fourth*, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

*Fifth*, The Chairman of the Council shall be the custodian of the bonds and saving-bank books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

*Sixth*, There shall be annually appointed by the Council, an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, the Chairman to be a member of the Finance Committee.

*Seventh*, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

*Eighth*, The Treasurer having thus balanced his books and made out his report, shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council shall forward to the Chairman of the Auditing Committee, at the same time and place, the bonds, saving-bank books, and accounts of the same that may be in his hands.

*Ninth*, Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, saving-bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Auditing Committee.

*Tenth*, There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., received by them; and previous to the 1st day of August following, to make a report thereon, in writing, to the chairman of the Council.

*Eleventh*, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

*Twelfth*, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

*Thirteenth*, The Finance Committee shall each year, previous to June 1st, present to the Council for its consideration a list of appropriations to cover the various expenditures of the coming fiscal year, the total of such appropriations to be based on the probable amount to be received from the annual dues for the coming year. No payment shall be made in excess of said appropriation except by special vote of the Council.

## FORM OF APPLICATION FOR MEMBERSHIP.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them. I also enclose the annual contribution, five dollars, for the first year of my membership.

Name in full.....

Number and Street.....

Town and State.....

Recommended by the undersigned two members in good standing :

.....

.....

## FORMS OF PROPOSITIONS AND OF COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VII., ARTICLE II., OF THE BY-LAWS.

THE undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VII., Article II. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES OF CANDIDATES.

ADDRESS.

Proposed by.....

.....

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full.....

Date.....

Address.....

.....

To be sent to Geo. W. Kennedy, Secretary of the Committee on Membership Am. Ph. Assoc., Pottsville, Penn.

## ROLL OF MEMBERS.

## HONORARY MEMBERS.

## FOREIGN COUNTRIES.

## AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

## BELGIUM.

A. T. De Meyer, *Brussels*, 1868.

Norbert Gille, *Brussels*, 1868.

## ENGLAND.

Dr. John Attfield, *London*, 1871.

Joseph Ince, *London*, 1882.

Michael Carteighe, *London*, 1882.

Richard Reynolds, *Leeds*, 1882.

Thomas Greenish, *London*, 1882.

## FRANCE.

Dr. G. Planchon, *Paris*, 1877.

## GERMANY.

Dr. Hermann Hager, *Frankfurt a. d. Oder*, 1868.

Dr. Carl Schacht, *Berlin*, 1882.

Dr. Edward Schaer, *Strassburg*, 1877.

Dr. G. Dragendorff, *Rosstock*, 1868.

## NETHERLANDS.

Dr. J. E. De Vrij, *The Hague*, 1871.

## RUSSIA.

Dr. J. von Martenson, *St. Petersburg*, 1882.

## ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the General Secretary and Treasurer of all changes of address.

(The names of Life Members in SMALL CAPS. Names of Life Members under the old Constitution in *italics*.)

## UNITED STATES OF AMERICA.

## ALABAMA.

*Auburn.*

Miller, Emerson Romeo ..... 1895

*Mobile.*

Bauer, David Samuel ..... 1894

Brown, Albert Edward ..... 1887

CANDIDUS, PHILIP CHARLES ..... 1857

McAfee, John James ..... 1890

Mohr, Charles ..... 1871

Mohr, Charles A. .... 1894

Moore, Thomas Ferguson ..... 1894

Ortmann, John Henry ..... 1894

Punch, William Francis ..... 1874

Smith, Thomas Edmond ..... 1894

Tucker, Mosely Fleming ..... 1888

Van Antwerp, Andrew ..... 1890

Van Antwerp, Garet ..... 1880

*Montgomery.*

Andrew, Edgar Cecil ..... 1895

Dent, Warren Fillmore ..... 1895

Knabe, Gustavus Alexander ..... 1876

*Selma.*

Galt, Edward Pegram ..... 1883

## ARIZONA.

*Phoenix, Maricopa Co.*

Eschman, Clemens Louis ..... 1889

Furl, Irwin William ..... 1894

*Prescott.*

Brisley, Harry ..... 1894

*Tempe.*

Hudson, Taliaferro Flournoy ..... 1894

## ARKANSAS.

*Batesville.*

Fletcher, John Wade ..... 1894

*Camden.*

Morgan, Aylmer Lee ..... 1890

*Diamond P. O.*

Laird, John ..... 1895

*Forrest City.*

Webb, David Crawford ..... 1896

*Fort Smith.*

Morton, John Walker ..... 1894

Sparks, James Mitchell ..... 1894

*Helena.*

King, Robert Bruce ..... 1896

*Hot Springs.*

Carr, Will Laforce ..... 1894

Klein, Ernest Frederick ..... 1894

*Little Rock.*

Bond, John Barnitz ..... 1883

Colburn, Jesse McAlister ..... 1895

Dowdy, Joseph Franklin, Jr. .... 1894

Gibson, James Edwin ..... 1887

Jungkind, John August ..... 1887

*Lonoke.*

Airheart, Israel Burt ..... 1896

*Morrillon.*

Dashiell, Robert Moore ..... 1894

*Pine Bluff.*

Anderson, James McPhuter ..... 1893

Dewoody, William Lawrence ..... 1887

Valliant, George Enos ..... 1891



*Pocahontas.*

Skinner, William Henry ..... 1894

*Russellville.*

Kerr, William Whitman ..... 1887

*Searcy.*

Robertson, Felix Otey ..... 1890

*Van Buren.*

Kerr, Frank Gault ..... 1890

*Walnut Ridge.*

Wilson, John Edgar ..... 1896

## CALIFORNIA.

*Bakersfield, Kern Co.*

Drury, John Stimson ..... 1889

*Centreville, Alameda Co.*

Lernhart, August ..... 1889

*Fruit Vale, Alameda Co.*

Neppach, Stephen Alfred ..... 1889

*Iakeport.*

Myers, George Welton ..... 1894

*Los Angeles.*

Elbe, Constantine Berthold ..... 1877

Kirkland, Derwentwater ..... 1889

Parr, John Conrad ..... 1856

Rives, Edward B ..... 1889

*Marysville, Yuba Co.*

Flint, John Henry ..... 1889

*Monterey.*

Hilby, Francis Martin ..... 1886

*Napa.*

Levinson, Joseph ..... 1895

*Oakland.*

Flint, George Benjamin ..... 1889

Melvin, Samuel Houston ..... 1889

*Oroville, Butte Co.*

Ekman, Nils Adolf ..... 1889

*Pasadena.*

Bley, Alphonso Albert Willetts ..... 1889

*Sacramento.*

Helke, William Ludwig ..... 1889

Ray, Frederick Edwards ..... 1889

*San Francisco.*

Argenti, Jerome John Baptiste ..... 1893

Bayly, Charles Alfred ..... 1889

Calvert, John ..... 1870

Dawson, John Henry ..... 1882

Grossman, Edward Lorenzo ..... 1893

Joy, Edwin Wolcott ..... 1882

Moffit, Thomas Sebatier ..... 1861

Schmidt, Valentine ..... 1887

Searby, William Martin ..... 1882

Seifert, Charles Albert ..... 1893

Steele, James Gurden ..... 1859

Weihe, Otto Albert ..... 1893

Wenzell, William Theodore ..... 1870

White, Richard Edward ..... 1889

*Santa Clara.*

Oberdeener, Samuel ..... 1889

*Santa Cruz.*

Fay, Hamilton ..... 1889

*Santa Monica.*

Devine, John ..... 1887

*Stockton.*

Smith, William Clay ..... 1889

*Vacaville.*

Miller, James Monroe ..... 1889

*Vallejo, Solano Co.*

Topley, James ..... 1869

## COLORADO.

*Central City.*

Best, John ..... 1866

Davies, Llewellyn Powell ..... 1891

*Colorado Springs.*

Ward, Augustus Jae ..... 1893

*Denver.*

Beitenman, William Wallace ..... 1888

Black, John Reid ..... 1891

Ford, Charles Mangan ..... 1887

Hover, William Adgate ..... 1895

Huecker, John ..... 1891

Kline, Charles Sol ..... 1891

Kochan, John ..... 1888

Lord, Frank Jotham ..... 1889

McCrea, Harry Francis ..... 1895

Naly, Sarah Lusan ..... 1895

Scholtz, Edmund Louis ..... 1881

Stebbins, Harry Frank ..... 1891

Steinhauer, Frederick ..... 1881  
Walbrach, Arthur ..... 1881  
Ward, Charles Edward ..... 1895

*Fort Collins.*

Scott, Alexander Wear ..... 1893

*Glenwood Springs, Garfield Co.*

Ewing, Frederic Charles ..... 1889

*Hugo.*

Clowes, William Legh ..... 1895

*Leadville.*

Taylor, George Edward ..... 1895

*Littleton.*

Depeyre, Louis Nolél ..... 1894

*Longmont.*

Turrell, Judson Wade ..... 1893

*Lyons.*

Crona, Sixtus Edward Seine ..... 1885

*Pueblo.*

Cambier, Jacob ..... 1895

Wells, Charles Horton ..... 1893

*South Denver.*

Soetje, Edward Conrad ..... 1888

## COLUMBIA, DISTRICT OF,

*Washington.*

Boyd, George Washington ..... 1883

Brace, William Darling ..... 1895

Bradbury, Wymond Henry ..... 1895

Christiani, Charles ..... 1874

Coblentz, Joseph Daniel ..... 1894

Criswell, Francis McClure ..... 1892

Duckett, Walter G. .... 1876

Easterday, Herbert Clifton ..... 1893

Eppley, James Kerr ..... 1895

Flemer, Lewis ..... 1895

Henry, Frank Clinton ..... 1894

Herbst, William Parker ..... 1895

Hilton, Samuel Louis ..... 1890

Hurlebaus, George William ..... 1895

Hutton, Harry Dubant ..... 1891

Johnston, Henry Augustus ..... 1883

Koch, John Adolph ..... 1896

Major, John Richards ..... 1873

Martin, John Charles ..... 1883

Mulcahy, Daniel Domnick ..... 1895

Nattans, Arthur ..... 1883

Schafhirt, Adolph Julian ..... 1876

SIMMS, GILES GREEN CRAYCROFT .... 1860

Thompson, William Scott ..... 1871

Wehrly, Thomas McAleer ..... 1883

## CONNECTICUT.

*Ansonia.*

Smith, Samuel Wheeler ..... 1889

*Bridgeport.*

Fisher, Elbert Ellsworth ..... 1892

*Hartford.*

Chapin, Frederick Hastings ..... 1880

Edwards, Frederick Bulkeley ..... 1894

Goodwin, Lester Henry ..... 1875

Newton, Philo Woodhouse ..... 1892

Rapelye, Charles Andrew ..... 1876

Shannon, Thomas Ross Alvin ..... 1892

Stoughton, Dwight George ..... 1890

Tracy, David Wallace ..... 1892

Williams, John Kirby ..... 1875

*Jewett City.*

Chabot, David Pierre ..... 1895

*Meriden.*

Mosher, William Wooster ..... 1894

*Middletown.*

Pitt, John Richard ..... 1872

*Naugatuck.*

May, James Oscar ..... 1875

*New Britain.*

Perkins, Charles William ..... 1892

*New Haven.*

Dimock, Robert Hemphill ..... 1889

Eagly, James Thomas ..... 1894

Gessner, Emil Adolph ..... 1878

Hogan, John Joseph ..... 1890

Mix, Willis Lee ..... 1896

Spalding, Warren Alphonso ..... 1876

Sperry, Herman Jay ..... 1880

Wood, Alonzo Felton, Jr. .... 1890

Wood, James Prior ..... 1890

*New London.*

Nichols, John Cutter ..... 1886

*Noank, New London Co.*

Miner, Orrin Eugene ..... 1894

*Norwich.*

Duggan, James..... 1894  
 Osgood, Hugh Henry .....1875  
 Sevin, Nathan Douglas.....1875

*Putnam.*

Dresser, George Edward.....1886

*Thomaston.*

Williams, Charles Fish.....1888

*Thompsonville, Hartford Co.*

Smith, Edward Newton .....1885  
 Steele, George Robert.....1892

*Waterbury.*

Wilcox, Frederick .....1878  
 Woodruff, Roderick Samuel.....1876

*Willimantic.*

Wilson, Frank Milton .....1883

## DELAWARE.

*Wilmington.*

Belt, Zedekiah James.....1876  
 Harvey, John Marsh ... ..1890  
 Smith, Frank Roop .....1890  
 Smith, Linton.....1870  
 Watson, Herbert Kennedy.....1888

## FLORIDA.

*Apopka, Orange Co.*

Kent, Robert Restieaux.....1855

*De Land.*

Fisher, George Washington .....1893

*Fort George.*

Rollin, John Francis .....1859

*Jacksonville.*

Aird, William .....1887  
 Crum, John Darius.....1892  
 Dell, William Amos.....1890  
 Kirk, James Edgar.....1896

*Key West.*

DeArmona, Joseph Raymond.....1893

*Ocala.*

Delouest, Edward.....1890

*Pensacola.*

Cushman, Henry Clay.....1887

*St. Augustine.*

Smith, Lauriston Stephen.....1892  
 Woodman, Walter Irving .....1893

*Tallahassee.*

Schrader, Herman von Roden.....1891

*Tampa.*

Leonardi, Sydney Beauregard .....1890

*Titusville, Brevard Co.*

Dixon, John Marion .....1894

## GEORGIA.

*Americus.*

Murray, Emmett Leroy.....1894

*Atlanta.*

Avary, Moody Burt .....1892  
 Cronheim, Solomon.....1892  
 Dunwoody, Richard Gaillard.....1891  
 Freeman, William Benjamin .....1894  
 Jacobs, Joseph .....1894  
 Kelly, Gilliam Jeter .....1894  
 Payne, George Frederick .....1893  
 Sharp, Harry.....1890  
 Watson, Sidney Powell.....1887

*Augusta.*

Durban, Sebastian Charles .....1883  
 LAND, ROBERT HENRY.....1859  
 Smith, James Perrin.....1894

*Columbus.*

Turner, John Persons .....1894

*Darien.*

Cornell, Russell Wilbur.....1893

*Fitzgerald.*

Hall, Nettie Crabbe.....1893

*Greenville.*

Tigner, James Ogletree.....1890

*Jackson.*

Wagner, William Ignatius .....1892

*La Grange.*

Slack, Henry Richmond, Jr.....1890

*Macon.*

Brunner, Norman Isaac.....1878  
 Cheatham, Thomas Alexander.....1890  
 Ingalls, John.....1876

<i>Rome.</i>		Dorner, Emil August.....	1892
Curry, David W.....	1894	EBERT, ALBERT ETHELBERT.....	1864
Trevitt, Cleophas Aristobolus.....	1896	Feldkamp, Charles Louis.....	1893
<i>Savannah.</i>		Fischer, Oscar Frederick.....	1892
MacDonald, Allan Douglas.....	1895	Fleischer, Adolph Theodore.....	1888
Offutt, Willard Chase.....	1896	Forsyth, William Kitchin.....	1892
Rowlinski, Robert Antone.....	1892	Frerkson, Richard Christopher.....	1888
Solomons, Isaiah Abram.....	1894	FULLER, OLIVER FRANKLIN.....	1869
<i>Summerville.</i>		Gale, Edwin Oscar.....	1857
Arrington, Homer Houston.....	1892	Gale, William Henry.....	1857
<i>Thomasville.</i>		Grassly, Charles William.....	1884
Bondurant, Charles Scott.....	1888	Gray, William.....	1892
Thomas, Robert, Jr.....	1888	Hallberg, Carl Swante Nicanor.....	1879
IDAHO.		Hartwig, Charles Ferdinand.....	1881
<i>Caldwell.</i>		Hartwig, Otto Julius.....	1892
Smithson, David Elmer.....	1890	Heddens, Claus Heising.....	1893
<i>Murray, Shoshone Co.</i>		Hereth, Franklin Samuel.....	1893
Ingalls, Albert Orfila.....	1885	Hogan, Louis Cass.....	1890
ILLINOIS.		Hogey, Julius Henry.....	1880
<i>Aurora.</i>		Houghton, Harry James.....	1891
Staudt, Louis Carl.....	1890	Jamieson, Thomas Nevin.....	1888
<i>Bloomington.</i>		Kirchgasser, William Charles.....	1888
Green, Hamer Herschel.....	1892	Klein, Frederick.....	1893
<i>Bradford, Stark Co.</i>		Klotz, August Edward.....	1895
Plummer, David Gorham.....	1869	Knudsen, Rudolph Hans.....	1892
<i>Cairo.</i>		Kraemer, Henry.....	1892
Schuh, Paul Gustav.....	1894	Leenheer, Bastian.....	1891
<i>Camp Point, Adams Co.</i>		Lehman, Louis.....	1895
Bartells, George Case.....	1881	Lord, Thomas.....	1882
<i>Carlinville, Macoupin Co.</i>		Lundberg, John Christian.....	1892
Loehr, Theodore Christian.....	1888	Maguire, Andrew Herman Jos. McBurney.....	1896
<i>Chicago.</i>		Matthews, Charles Edwards.....	1893
Bartlett, Nicholas Gray.....	1864	Miner, Maurice Ashbel.....	1880
Behrens, Emil Christian Louis.....	1893	Morland, Robert Lawson.....	1892
Behrens, Paul Johannes Heinrich.....	1888	Oglesby, George Daniel.....	1891
BIROTH, HENRY.....	1865	Oldberg, Oscar.....	1873
Bishop, Samuel Edward.....	1890	Parsons, John.....	1865
Bodemann, Wilhelm.....	1887	Patterson, Theodore Henry.....	1869
Bronson, George Styles.....	1893	Pattison, George Henry.....	1893
Button, Charles Edwin.....	1881	Porter, Millett Nathan.....	1892
Conrad, John.....	1887	Puckner, William August.....	1888
Daubach, Charles Joseph.....	1889	Rhode, Rudolph Ernst.....	1887
Day, William Baker.....	1895	Sargent, Ezekiel Herbert.....	1864
		Scherer, Andrew.....	1884
		Schmidt, Florian Charles.....	1882
		Schmidt, Frederick Michael.....	1887
		Scott, J. McDonald.....	1892
		Sempill, Walter Morrison.....	1892
		Truax, Charles.....	1882
		Voge, Richard.....	1893
		Wheeler, Charles Gilbert.....	1892
		WHITFIELD, THOMAS.....	1865

WOLTERS DORF, LOUIS.....	1865	<i>Streator.</i>	
Wooten, Thomas Victor .....	1893	Higby, William Herbert.....	1892
Zahn, Emil Augustus.....	1881	<i>Stronghurst, Henderson Co.</i>	
<i>Du Quoin.</i>		Harter, Isaac Foster .....	1893
Carr, Jerome Carroll .....	1895	<i>Vienna.</i>	
<i>Eust St. Louis.</i>		Simpson, William Calvert.....	1895
Knoebel, Thomas.....	1892		
<i>Geneseo.</i>		INDIAN TERRITORY.	
Stamm, Dante Milton .....	1896	<i>Eufaula.</i>	
<i>Hanna City.</i>		Moore, Charles Gates .....	1892
Davis, Samuel Charles.....	1893	<i>Wynnewood.</i>	
<i>Highland.</i>		Hillebert, George Allen .....	1894
Mueller, Adolphus .....	1871		
<i>Kankakee.</i>		INDIANA.	
Rogers, Henry Horace .....	1895	<i>Bourbon.</i>	
<i>La Salle.</i>		Weiser, William Augustus .....	1894
Hattenhauer, Robert Christopher ....	1881	<i>Columbus.</i>	
<i>Moline.</i>		Stahlhuth, Ernst Henry William .....	1887
Sohrbeck, George Henry.....	1888	<i>Edinburg.</i>	
<i>Momence.</i>		Moffett, Thomas James .....	1893
Culver, Anson Allen .....	1890	<i>Evansville.</i>	
<i>Mt. Vernon.</i>		Schlaepfer, Henry John .....	1879
Morse, Edward Worth.....	1896	<i>Fairmount.</i>	
<i>North Alton.</i>		Beasley, William Alexander .....	1894
Barth, George Fred. ....	1896	Edwards, Nathan Wilson .....	1879
<i>Pekin.</i>		<i>Garrett.</i>	
Ehrlicher, Henry Michael .....	1892	Stoehr, Julius John .....	1894
<i>Peoria.</i>		<i>Indianapolis.</i>	
Benton, Wilber Merritt.....	1888	Carter, Frank Hahneman.....	1891
Heschong, John Frederick.....	1896	Dill, Josiah Byron .....	1878
Lueder, Fritz .....	1894	Eads, Robert Isom.....	1895
Vonachen, Frank Herman .....	1895	Eichrodt, Charles William .....	1892
Zimmermann, Albert.....	1893	Field, Claud .....	1890
Zimmermann, Charles .....	1881	Frauer, Herman Emanuel.....	1881
<i>Peru, La Salle Co.</i>		Huder, Henry J .....	1894
Danz, Martin .....	1895	Hurty, John Newell.....	1882
<i>Pontiac.</i>		Leist, Jacob Lawrence.....	1881
Murphy, John Spence .....	1896	Lilly, Eli .....	1878
<i>Rock Island.</i>		Lilly, Josiah Kirby.....	1890
Wyckoff, Elmer Ellsworth Ai.....	1894	Pfafflin, Henry Adolph .....	1892
<i>Saybrook.</i>		Shake, Homer C .....	1862
Travis, Miles Beaty .....	1889	SLOAN, GEORGE WHITE.....	1857
		Zimmer, Harry Edgar .....	1892
		<i>Jeffersonville.</i>	
		Loomis, John Clarence .....	1876

*La Porte.*

Meissner, Frederick William, Jr. .... 1890

*Muncie.*

Nickey, Frank Birch ..... 1895

*New Albany.*

Henry, Charles Landon ..... 1893

Knoefel, Bruno ..... 1896

Knoefel, Charles Deitrick ..... 1894

*Rockport, Spencer Co.*

Anderson, Charles Burnett ..... 1891

*South Bend.*

Eliel, Leo ..... 1882

*Terre Haute.*

Baur, Jacob ..... 1879

Prentiss, John Brooks ..... 1894

*Warren.*

Hickerson, William Henry ..... 1894

## IOWA.

*Britt.*

Carton, John Arthur ..... 1895

*Clinton.*

Majer, Oscar ..... 1880

*Davenport.*

Ballard, John Winthrop ..... 1871

Harrison, Jacob Hugh ..... 1883

*Des Moines.*

Judisch, George ..... 1890

Kaiser, William O ..... 1893

Macy, Sherman Riley ..... 1891

Ward, Milo Woodruff ..... 1895

*Dubuque.*

Hervey, James ..... 1892

Ruete, Theodore William ..... 1870

Torbert, Willard Horatio ..... 1887

Wittmer, Joseph Washington, Jr. .... 1896

*Fort Dodge.*

Oleson, Olaf Martin ..... 1877

*Fort Madison.*

Schafer, George Henry ..... 1871

*Garner.*

Collins, Carrie Smith ..... 1895

*Iowa City.*

Boerner, Emil Louis ..... 1877

*Keokuk.*

Kiedaisch, John Frederick, Jr ..... 1893

*Lost Nation.*

McMeel, James Henry ..... 1895

*Muscatine.*

Braunwarth, Alice Louisa ..... 1892

Krehe, John Theodor ..... 1884

*Oskaloosa.*

Pickett, John Harvey ..... 1887

*Sheldon.*

Howard, Fletcher ..... 1895

*Sioux City.*

Arnold, Charles Frederick ..... 1891

Crady, Edward Edmond ..... 1892

Moore, Silas Harwood ..... 1880

Scherling, Gustav ..... 1884

*Stuart.*

Treat, Joseph Augustus ..... 1885

*Waterloo.*

Wangler, Conrad David ..... 1876

## KANSAS.

*Argentine.*

McGeorge, William ..... 1895

*Atchison.*

Noll, Mathias ..... 1891

Tomlinson, Burton Amos ..... 1895

*Gypsum City, Saline Co.*

Schmitter, Jonathan ..... 1892

*Hiawatha.*

Miner, Mary Olds ..... 1892

*Hillsboro.*

Entz, Jacob John ..... 1895

*Hutchinson.*

Ardery, Lorimer ..... 1895

*Lawrence.*

Hamlin, James Alpheus ..... 1895

Leis, George ..... 1869

Moore, John Thomas ..... 1888

Sayre, Lucius Elmer ..... 1883

Woodward, Brinton Webb ..... 1895

<i>Leavenworth.</i>		Peyton, Robert Docker.....	1887
Brown, Robert J .....	1862	PFINGST, FERDINAND JOHN.....	1867
Mehl, Henry William .....	1892	Rademaker, Hermann Henry.....	1879
<i>Marion.</i>		Renz, Frederick Jacob .....	1883
Young, Hiram W.....	1894	Scheffer, Emil.....	1872
<i>Marysville.</i>		Schliemann, Edward Bernard.....	1880
Ault, Edward Abbott.....	1895	Schoettlin, Albert John.....	1882
<i>Ottawa.</i>		Snyder, Robert Johnson .....	1887
Becker, Charles Louis.....	1892	Thiemann, John Henry, Jr.....	1896
<i>Peabody.</i>		Troxler, Constantine, Jr.....	1896
Roberts, Daniel John .....	1881	Votteler, William.....	1895
<i>Topeka.</i>		<i>Newport.</i>	
Merrell, Ashbel Hill .....	1884	Holzhauser, Gustavus.....	1893
Washburn, Harry Monroe .....	1890	<i>Shelbyville.</i>	
<i>Wichita.</i>		Preissler, Henry Webber.....	1893
Hettinger, Howard Huyett.....	1894	<i>Somerset.</i>	
KENTUCKY.		Porter, Chilton Scott.....	1882
<i>Carrollton.</i>		<i>Taylorsville.</i>	
Geier, Oscar William. ....	1880	Rogers, Wiley .....	1874
<i>Covington.</i>		<i>Uniontown.</i>	
Auf'mwasser, Hugo William .....	1892	Hardigg, William Leopold.....	1881
Auf'mwasser, Julius Hermann .....	1893	LOUISIANA.	
Belt, James Ferris .....	1892	<i>Baton Rouge.</i>	
Pieck, Edward Ludwig .....	1887	Boisvert, Pierre.....	1891
Zwick, George Albert .....	1874	<i>Bayou Goula.</i>	
<i>Flemingsburg.</i>		Viallon, Paul Louis.....	1870
Reynolds, John Jefferson .....	1876	<i>Bayou Sara.</i>	
<i>Frankfort.</i>		Kilbourne, Lewis Perkins.....	1891
Averill, William Henry.....	1874	<i>Bonnet Carré.</i>	
Gayle, John William .....	1891	Donaldson, Pierre Armand .....	1891
<i>Henderson.</i>		<i>Hammond.</i>	
McFarland, Robert Mumford.....	1893	Brewer, John Weems.....	1893
<i>Louisville.</i>		<i>Minden.</i>	
Beckmann, Oscar Albert.....	1879	Goodwill .....	1891
Colgan, John.....	1867	<i>New Iberia.</i>	
Constantine, Edward Richard .....	1891	Lee, Charles Hill.....	1891
Diehl, Conrad Lewis .....	1863	LEE, JAMES AUGUSTIN.....	1856
Dilly, Oscar Charles.....	1888	<i>New Orleans.</i>	
Dimmitt, Addison .....	1895	Army, Harry Vin .....	1891
Jones, Simon Newton .....	1870	Breshn, Michael Thomas.....	1891
Mueller, Otto Edward.....	1888	Capdau, Pierre August.....	1895
Newman, George Abner .....	1866	Chalin, Louis Fisk.....	1887
Overstreet, William Payne .....	1893	Dejan, John Baptist George ....	1891
Peter, Minor Cary .....	1894	Finlay, Alexander Kirkwood .....	1883
		Girling, Robert Nash.....	1891

Godbold, Fabius Chapman.....1887  
 Grambois, Augustin.....1891  
 Graner, Albert.....1891  
 Graner, William.....1891  
 Hubert, Ernest.....1891  
 Kaczoroski, Adolph Onesime.....1895  
 Keppler, Charles Lewis.....1891  
 Keppler, Christian Lewis.....1882  
 Lavigne, Jean Baptist.....1891  
 Legendre, Joseph Amilcar.....1891  
 Levy, William Michael.....1894  
 Lvons, Isaac Luria.....1875  
 May, Eugene.....1891  
 Metz, Abraham Lewis.....1887  
 Otto, John Nicholas Washington.....1891  
 Roux, Nemours Peter.....1895  
 Rudolf, Mrs. Eliza.....1887  
 Siekman, Ivan Francis.....1891  
 Stendel, Julius Guthardt.....1891  
 Taylor, Walter Thomas.....1891  
 Tuma, Bruno Ottokar Camillo.....1891  
 Wunderlich, Edward.....1891

*Plaquemine.*

Hiriart, Sebastian.....1891

*Port Allen.*

Charroppin, Emile Lafond.....1891

*St. Joseph.*

Kershaw, John Pearis.....1895

MAINE.

*Auburn.*

Burrill, John Walter.....1896  
 Robinson, William Allen.....1892

*Augusta.*

Partridge, Charles Kimball.....1867  
 Partridge, Frank Reuben.....1895

*Bangor.*

HARLOW, NOAH SPARHAWK.....1859  
 Sweet, Caldwell.....1881

*Bath.*

Anderson, Samuel.....1876

*Belfast.*

Moody, Richard Henry.....1876

*Biddeford.*

Boynton, Herschel.....1875

*Fillsworth.*

Parcher, George Asa.....1875

*Lewiston.*

Lowell, Edward Mark.....1896  
 Moulton, Daniel Pierce.....1891

*Machias.*

Crane, Frank Trussel.....1894

*Pittsfield.*

Libby, Henry Fitzgerald.....1882

*Portland.*

Cogan, Denis Stephen.....1896  
 Drew, Walter Israel.....1896  
 Earl, Noble Clarkson.....1894  
 Frye, George Carlton.....1879  
 Goold, Joseph Edwin.....1896  
 Hay, Edward Allston.....1889  
 Heseltine, Daniel Wilber.....1896  
 McClearn, Henry Trefethen.....1896  
 Perkins, Benjamin Abbott.....1878  
 Schlotterbeck, Augustus George.....1896

*Saco.*

Sawyer, Charles Henry.....1896

*Sanford.*

Wingate, Frank Holman.....1896

*South Windham.*

Rand, Daniel Moulton.....1892

*Waterville.*

Dorr, George Watson.....1896

*Woodfords.*

Parks, John Kimball.....1856

MARYLAND.

*Baltimore.*

Brack, Charles Emil.....1876  
 Burrough, Horace.....1883  
 Caspari, Charles, Jr.....1883  
 Culbreth, David Marvel Reynolds.....1883  
 Davis, John Alexander.....1894  
 Dohme, Alfred Robert Louis.....1891  
 Dohme, Charles Emile.....1863  
 DOHME, LOUIS.....1859  
 ELLIOTT, HENRY ALEXANDER.....1859  
 Emich, Columbus Valentine.....1863  
 Fischer, Ewald Baldwin.....1895  
 Foster, James Webb.....1894  
 Frames, John Fuller.....1890  
 Gilpin, Henry Brooke.....1889



Gosman, Adam John.....	1870	DRURY, LINUS DANA.....	1871
Hancock, John Francis.....	1863	Dunham, Henry Bristol.....	1892
Hancock, John Henry.....	1870	Durkee, William Carley.....	1885
Hynson, Henry Parr.....	1890	Cammon, Irving Parker.....	1891
Muth, George Louis.....	1894	Godding, John Granville.....	1875
Nordmann, Herman.....	1895	Gorman, John Thomas Bernard.....	1892
Quandt, Arthur Albert.....	1894	Hayes, James Henry.....	1892
Quandt, Ernest Edmund.....	1894	Hedley, Thomas Albert.....	1893
Richardson, Thomas Leonard.....	1895	Jones, James Taber.....	1875
<i>Russell, Eugene James</i> .....	1856	Kelley, Edward Samuel.....	1871
Schulze, Louis.....	1892	Lauricella, Felice.....	1896
<i>Sharp, Alpheus Phineas</i> .....	1855	Leavitt, Miner La Harpe.....	1890
Simon, William.....	1885	Lewis, Ernest Grant.....	1892
Smith, Theodric.....	1890	Lowd, John Colby.....	1871
Thomsen, John Jacob.....	1883	McColgan, Adam Thomas.....	1892
Vellines, Davies.....	1895	Mowry, Albert Daniel.....	1884
Westcott, James Walling.....	1890	<i>Patten, Ichabod Bartlett</i> .....	1858
WINKELMANN, JOHN HENRY.....	1864	Phillimore, Frederick George.....	1894
<i>Chesiertown.</i>		Pierce, William Herbert.....	1879
Stam, Colin Ferguson.....	1882	Prescott, Horace Augustus.....	1875
<i>Cumberland.</i>		Sawyer, William Frederick.....	1885
Herman, John George.....	1878	Scoville, Wilbur Lincoln.....	1891
Shryer, Thomas Wilson.....	1875	Sharples, Stephen Paschell.....	1875
<i>Frederick City.</i>		SHEPPARD, SAMUEL ATRUS DARLINGTON.....	1865
Schley, Steiner.....	1878	Siegemund, Charles Augustus.....	1882
<i>Hagerstown.</i>		Smith, Linville Holton.....	1892
WINTER, JONAS.....	1863	Stowell, Daniel.....	1875
<i>Snow Hill.</i>		Sumner, Alphonso.....	1892
Powell, William Cottingham.....	1895	Tilden, Amos Kendall.....	1892
MASSACHUSETTS.		Tucker, Greenleaf Robinson.....	1890
<i>Andover.</i>		Vargas-Heredia, Jorge.....	1891
Parker, George Hawkins.....	1874	Varney, Edward Francis.....	1892
<i>Athol.</i>		Wells, Edwin Herbert.....	1893
Burton, William Arthur.....	1896	West, Charles Alfred.....	1892
Hobbs, William.....	1892	Wheeler, William Dexter.....	1892
<i>Boston.</i>		Williams, George Gorham.....	1888
Baird, Julian William.....	1894	WILSON, BENJAMIN OSGOOD.....	1859
Bassett, Charles Harrison.....	1867	Wood, Edward Stickney.....	1879
Boyden, Edward Cleveland.....	1874	<i>Brockton.</i>	
Burnham, Alfred Augustus, Jr.....	1891	Randall, Frank Otis.....	1893
CANNING, HENRY.....	1865	<i>Cambridge.</i>	
Capper, William Ernest.....	1892	Clafin, Walter Addison.....	1896
Chapin, William Arms.....	1880	Phillips, Carrie Elizabeth.....	1894
Colton, James Byers.....	1865	<i>Cambridgeport.</i>	
Copeland, Sidney Fred.....	1892	BAYLEY, AUGUSTUS RAMSEY.....	1859
Cramer, Max.....	1881	La Pierre, Elie Henry.....	1892
<i>Doliber, Thomas</i> .....	1859	Laing, Alfred Allan.....	1888
		Norton, George Edward.....	1895
		ORNE, JOEL STONE.....	1859
		Porter, Louis Fowler.....	1892

<i>Charlestown.</i>		Bunker, Elihu.....	1885
Marshall, Ernest Clifton .....	1875	Shurtleff, Israel Hammond.....	1875
STACEY, BENJAMIN FRANKLIN .....	1860	<i>Newburyport.</i>	
<i>Chelsea.</i>		Goodwin, William W.....	1853
BUCK, JOHN .....	1855	<i>Newton.</i>	
Buck, John Lynian .....	1883	Crowdle, John Edward .....	1894
<i>Concord.</i>		Hudson, Arthur .....	1882
Richardson, Horatio Stillman.....	1892	Mason, Harry Ruggles .....	1894
<i>East Weymouth.</i>		<i>North Andover.</i>	
Hoyt, George Melvin .....	1875	Berrian, George Washington .....	1857
<i>Fall River.</i>		<i>North Weymouth.</i>	
Riddell, Benjamin Franklin.....	1892	Turner, Thomas Larkin.....	1853
<i>Fitchburg.</i>		<i>Orange.</i>	
Estabrook, Henry Arthur .....	1886	Fish, Frederic Willis .....	1892
<i>Great Barrington.</i>		<i>Peabody.</i>	
Whiting, John Fred. ....	1895	Grosvenor, Daniel Prescott.....	1881
<i>Haydenville.</i>		<i>Pittsfield.</i>	
Cone, Alfred George.....	1892	Hydren, Carl.....	1892
<i>Holyoke.</i>		Manning, John Henry .....	1889
Ball, Charles Ely .....	1885	Murphy, John Joseph .....	1892
Fortier, Lawrence Hubert .....	1892	<i>Plymouth.</i>	
<i>Jamaica Plain.</i>		Carver, Frank Hahnemann.....	1891
Ernst, Frank Frederick .....	1891	<i>Provincetown.</i>	
<i>Lawrence.</i>		Adams, John Darrow.....	1892
Glover, William Henry .....	1891	<i>Quincy.</i>	
WHITNEY, HENRY MARTIN.....	1859	Whall, Joseph Stokes .....	1873
<i>Lee.</i>		<i>Rockland.</i>	
Pease, Francis Merrick .....	1880	Estes, Joseph Joslyn.....	1870
<i>Lexington.</i>		<i>Rockport.</i>	
Perham, Henry Albert.....	1892	Blatchford, Eben .....	1857
<i>Lowell.</i>		<i>Salem.</i>	
Bailey, Frederick .....	1869	Nichols, Thomas Boyden .....	1876
Butler, Freeman Hall .....	1874	Price, Charles Henry.....	1882
Hood, Charles Ira .....	1871	Price, Joseph.....	1888
Robinson, Edward Augustus.....	1888	<i>Shelburne Falls.</i>	
Thomasson, Anders.....	1892	Baker, Edwin .....	1875
<i>Marlborough.</i>		<i>Somerville.</i>	
Hartshorn, Frederick Arthur .....	1880	Flanagan, Lewis Cass .....	1875
<i>Milford.</i>		<i>South Hadley Falls.</i>	
Bridges, Charles Herbert.....	1892	Benhard, Albert Henry.....	1894
<i>New Bedford.</i>		<i>Stoneham.</i>	
Blake, James Edwin.....	1866	Drake, Frederick Townsley.....	1894
		Patch, Edgar Leonard .....	1872
		Ward, Charles Abraham .....	1891

*Wellesley.*

Tailby, Joseph Allen ..... 1892

*Woburn.*

Brooks, Frederick Pratt ..... 1891

French, John Innes ..... 1894

*Worcester.*

Hale, Chester Stanley ..... 1892

Harris, Francis Mason ..... 1894

Scott, George Theodore ..... 1883

Williams, Duane Burnett ..... 1881

## MICHIGAN.

*Ann Arbor.*

Boyce, Samuel Robert ..... 1894

Brown, Henry Jefferson ..... 1882

Eberbach, Ottmar ..... 1869

Mann, Albert ..... 1889

Prescott, Albert Benjamin ..... 1871

Schlotterbeck, Julius Otto ..... 1888

Stevens, Alonzo Burdette ..... 1885

*Armada, Macombe Co.*

Phillips, Edwin Freeman ..... 1888

*Benton Harbor.*

Bird, Harry L. .... 1891

*Corunna.*

Reidy, Michael ..... 1894

*Detroit.*

Breningstall, Reuben Grant ..... 1891

Caldwell, James William ..... 1875

Dupont, William ..... 1887

Helfman, Joseph ..... 1894

McFarland, Andrew ..... 1891

Parker, Arthur Sheldon ..... 1891

Perry, Frederick William Riley ..... 1885

Sherrard, Charles Cornell ..... 1893

Stearns, Henry Albyn ... 1888

Stevens, Fred. D. .... 1888

Stewart, Francis Edward ..... 1884

Thompson, Frank Augustus ..... 1888

Vernor, James ..... 1866

Warren, William Matthew ..... 1889

*East Saginaw.*

Prall, Delbert Elwyn ..... 1876

*Flushing.*

Sprague, Wesson Gage ..... 1895

*Grand Rapids.*

Schrouder, Benjamin ..... 1895

*Greenville.*

Hall, William Alanson ... 1888

*Ionia.*

Gundrum, George ..... 1882

*Kalamazoo.*

McDonald, George ..... 1871

Todd, Albert May ... 1885

*Muskegon.*

Brundage, Fred ..... 1888

Jesson, Jacob ..... 1872

*Owasso.*

Parkhill, Stanley E. .... 1887

*Red Jacket, Houghton Co.*

McDonald, Daniel Turner ..... 1884

*St. Clair City.*

Ward, George James ..... 1893

## MINNESOTA.

*Alexandria.*

Holverson, Henry Theophilus ..... 1895

*Anoka.*

Goodrich, George Herbert ..... 1895

*Austin.*

Dorr, Edward Clark ..... 1895

*Brainerd.*

Percy, William Gil ..... 1892

*Duluth.*

Boyce, Samuel F ..... 1871

Sweeney, Robert Urmsby ..... 1866

*Faribault.*

Hawley, William Bentley ..... 1895

*Fergus Falls.*

Axness, Ole Mikkelsen ..... 1895

*Grove City.*

Gayner, John Niles ..... 1890

*Heron Lake.*

Kellam, Charles Roderick Judson .... 1895

*Lake Park.*

Heyerdahl, Carl Otto ..... 1893

*Minneapolis.*

Crolius, Frank Marcelous.....	1884
Danek, John Francis.....	1895
Donaldson, Joseph Coddington.....	1893
Griffen, Truman.....	1895
Harrah, John William.....	1895
Huhn, George.....	1884
King, George Alexander Newton ....	1892
Lariviere, Telesphore.....	1896
Peterson, Johannes Otto.....	1895
Sanderson, Stephen Francis.....	1880
Shumpik, Edward.....	1895
Thompson, Albert Delano .....	1895
Webster, Hendrick Gordon .....	1895
Wulling, Frederick John.....	1893

*New Ulm.*

Eckstein, Andrew Joseph.....	1895
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*Owatonna.*

Gausewitz, William John Frederick...	1895
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*Rochester.*

Qvale, Victor Asbgörn.....	1889
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*Spring Valley.*

Rohde, Claus Frederick.....	1885
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*Stillwater.*

Richard, Alexander .....	1896
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*St. Paul.*

Faber, Frederick William.....	1895
Frost, William Arthur .....	1892
Getty, Wilmot Stevenson. ....	1896
Hall, Alden Taylor .....	1895
Harding, Lawrence Arthur.....	1892
Heller, Charles Tomkins.....	1895
Marelius, Charles Robert .....	1896
Simmon, Karl.....	1880
Warren, Edwin Alonzo.....	1887
Zimmermann, Bernard .....	1895

*Wabasha.*

Trautmann, Ludwig.....	1893
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*Wells.*

Stiles, Justin Edson .....	1895
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*Wheaton.*

Mork, Thomas Karl.....	1895
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*Worthington.*

Humiston, Edwin Ray, Jr.....	1896
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## MISSISSIPPI.

*Aberdeen, Monroe Co.*

Eckford, Joseph William .....	1883
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*Meridian.*

Lillybeck, Oscar.....	1891
Moore, Joshua Forrest.....	1891
White, William Henry.....	1891

*Natchez.*

Means, John Coalter .....	1891
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*Port Gibson.*

Shreve, John Alexander .....	1880
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*Scranton.*

Cox, William Augustus .....	1894
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## MISSOURI.

*Aux Vasse.*

Craighead, Gordon Garriet.....	1895
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*Boonville.*

Mittelbach, William .....	1891
Wooldridge, Daniel Turley.....	1890

*Carrollton.*

PETIT, HENRY MCEWEN.....	1860
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*Freeman.*

Dolan, Frank Linley.....	1888
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*Jefferson City.*

Brandenberger, Adolph.....	1894
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*Kansas City.*

Breunert, Herman Otto.....	1895
Corcoran, Charles Edward .....	1895
Crampton, Ferd Leslie .....	1896
Doerschuk, Albert Nathan .....	1895
Eyssell, George.....	1889
Hess, Paul Ludwig .....	1892
Lahme, Charles Adolph .....	1881
Walker, David.....	1894

*Kirkwood.*

Geiger, Charles Frederick.....	1894
Hemm, Louis Phillips.....	1894

*Lebanon.*

Farrar, Samuel Richard.....	1891
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*Marcelin, Linn Co.*

Shelton, William Armstrong.....	1891
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*Marshall.*

Franklin, Philip Henry.....	1881
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<i>Mexico, Audrian Co.</i>		Whelpley, Henry Milton.....1887	
LLEWELLYN, JOHN FREDERICK .....	1867	Whitcomb, Frederick Ezekiel.....1888	
<i>Newhall.</i>		Wilson, Charles Frederick .....	1891
Darrah, Andrew Jackson .....	1895	Wurmb, Theodore Henry.....	1890
<i>Old Orchard, St. Louis Co.</i>		<i>St. Mary.</i>	
Mueller, Ambrose .....	1894	Lawbaugh, Emanuel Sylvester.....	1895
<i>Orrick, Ray Co.</i>		MONTANA.	
McLean, George .....	1894	<i>Helena.</i>	
<i>Pierce City, Lawrence Co.</i>		Starz, Emil Alfred .....	1895
Armstrong, George Revington.....	1877	NEBRASKA.	
<i>Rich Hill.</i>		<i>Fairbury.</i>	
Youngs, William .....	1883	Pease, Autumn Vine .....	1893
<i>Sedalia.</i>		<i>Fremont.</i>	
Fleischmann, Augustus Theodor. ....	1885	Brunner, Charles Henry.....	1895
<i>St. Joseph.</i>		<i>Grand Island, Hall Co.</i>	
Clark, James Ryland .....	1895	Boyden, Henry D. ....	1893
Demond, Otto John.....	1892	Buchheit, Augustus William.....	1893
<i>St. Louis.</i>		<i>Omaha.</i>	
Alexander, Maurice William.....	1871	Kuhn, Norman Archibald.....	1878
Blank, Alois .....	1881	Sherman, Charles Rollin.....	1889
Boehm, Solomon .....	1871	NEVADA.	
Braun, Adolf Phillips Carl .....	1894	<i>Carson City.</i>	
Good, James Michener .....	1871	Steinmetz, Frank Jacob.....	1895
Grandjean, Charles.....	1871	<i>Gold Hill.</i>	
Grandjean, Eugene .....	1871	Westlake, Leonard John.....	1895
Hassebrock, Henry Fred.....	1884	<i>Reno.</i>	
Hennum, Francis.....	1881	Hodgkinson, Samuel Jackson.....	1895
Hinrichs, Gustavus Detlef.....	1895	Pinniger, William.....	1895
Klie, George Henry Charles.....	1878	<i>Virginia City.</i>	
Layton, Thomas.....	1892	Cole, Allen M. ....	1895
<i>Leitch, Arthur .....</i>	<i>1860</i>	Perkins, William Alexander .....	1869
Mallinckrodt, Edward .....	1869	<i>Winnemucca.</i>	
MEYER, CHRISTIAN FRIED. GOTTLIEB.	1860	Brown, William Ambrose.....	1893
Morley, William Jarman .....	1876	NEW HAMPSHIRE.	
Pauley, Frank Charles.....	1879	<i>Derry Depot.</i>	
SANDER, ENNO.....	1858	Bell, Samuel Howard .....	1890
Scheffer, Henry William.....	1863	<i>Dover.</i>	
Schurk, Louis.....	1890	TUFTS, CHARLES AUGUSTUS .....	1856
Sennewald, Ferdinand William .....	1865	<i>Exeter.</i>	
Stark, Harry Hinkle .....	1893	Wetherell, Albert Sumner.....	1892
Tomfohrde, Charles William .....	1890		
Uhlich, Ferdinand Gottlieb.....	1881		
Vitt, Rudolph Simon .....	1895		
Vordick, August Henry .....	1874		
Wall, Otto Augustus .....	1884		
Westmann, Frank Henry .....	1882		

*Hanover.*

Downing, Lucien Bliss .....1892

*Lebanon.*

Wilder, George Patterson ..... 1892

*Littleton.*

Kenney, Herbert Eastman .....1890

Robins, Wilbur Fiske .....1892

*Manchester.*

Baril, Joseph Benjamin .....1892

Miville, Francis Charles ..... 1877

Way, Frank Lester .....1893

*Nashua.*

Morse, Charles Milan .....1888

Whitman, Nelson Samuel .....1875

*New Market.*

Dearborn, George Luther .....1853

*Portsmouth.*

Grace, William Day .....1896

Green, Benjamin .....1888

Preston, Andrew Peabody .....1881

*Somersetworth.*

Hurd, John Charles .....1890

MOORE, GEORGE .....1859

## NEW JERSEY.

*Asbury Park.*

Woolley, Stephen Disbrow .....1888

*Atlantic City.*

Townsend, James Vaughan .....1896

Wescott, William Carter .....1896

*Beverly.*

Dougherty, Samuel Edward .....1875

*Bloomfield.*

Scherff, John Philip .....1877

Wood, George Mervin .....1890

*Bordentown.*

Carslake, George Middleton .....1880

*Bridgeton.*

Dare, Charles Ford .....1889

Davis, Theodore Garrison .....1890

*Camden.*

Beringer, George Mahlon. ....1893

*East Orange.*

Davis, George Randolph .....1883

McIntyre, Byron Floyd .....1876

Williams, Seward Whiting .....1887

*Elizabeth.*

Frohwein, Richard .....1867

Kent, Henry Avery, Jr. ....1880

Oliver, William Murray .....1875

*Englewood.*

Rockefeller, Lucius .....1880

*Freehold.*

Walker, John Putnam .....1881

*Hoboken.*

KLUSSMANN, HERMANN .....1876

*Jersey City.*

Abernethy, Maxwell .....1865

Beardmore, William Arthur .....1890

Foulke, James .....1881

Gallagher, John Charles .....1893

Hartnett, Eugene .....1893

Lohmann, Herman Joseph .....1896

Lyons, Fred. Wyckoff .....1893

Vockroth, Emil .....1893

White, George Henderson .....1868

Wienges, Conrad .....1875

*Keyport.*

Warn, William Edgar .....1886

*Lakewood, Ocean Co.*

Harrison, William John .....1896

*Madison.*

Brown, William Thompson .....1894

*Matawan, Monmouth Co.*

Slater, Frank Hovey .....1882

*Medford.*

Thorn, Henry Prickett .....1879

*Morristown.*

Carrell, Eugene Ayers .....1875

*Mt. Holly.*

Jones, Edward Burrough .....1894

WHITE, AARON SMITH .....1860

*Newark.*

Betzler, Jacob .....1880

Bruguier, Francis .....1876

HOLZHAUER, CHARLES .....1873

Joyce, Robert .....	1895
Mennen, Gerhard .....	1888
Sayre, William Henry .....	1877
Smith, Charles Bradley .....	1868
Smith, Clarence Pennington .....	1890
Staebler, Richard Elimar Johannes .....	1892
Stamford, William Harrison .....	1876
Van Winkle, Abraham .....	1871
Wright, Arthur Wellington .....	1894

*New Brunswick.*

Kilmer, Frederick Barnett .....	1886
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*Paterson.*

Leonhard, Rudolph Ernest .....	1891
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*Perth Amboy.*

Parisen, George Warren .....	1892
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*Plainfield.*

Ollif, James Henry .....	1867
Reynolds, Howard Prescott .....	1875
Shaw, Robert Johnson .....	1875

*Princeton.*

Priest, Carlton Rodgers .....	1896
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*Somerville.*

Cook, Gilbert Snowden .....	1886
Field, James Clinton .....	1894

*South Amboy.*

JACQUES, GEORGE WASHINGTON .....	1869
Parisen, Allen Conrey .....	1895

## NEW MEXICO.

*Hillsborough.*

Nowers, Lawrence Edward .....	1892
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*Silver City.*

Porterfield, William Clement .....	1895
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## NEW YORK.

*Albany.*

Bradley, Frank Henry .....	1896
Bradley, Theodore James .....	1896
Gaus, Charles Henry .....	1879
Husted, Alfred Birch .....	1879
Lewi, Theodore J. ....	1896
Michaelis, Gustavus .....	1882
Richardson, Frank .....	1896
Turner, George Heather .....	1880
Walker, William John .....	1880

*Binghamton.*

Cox, John Thomas .....	1892
Otis, Clark Zelotes .....	1886

*Brooklyn.*

Bartley, Elias Hudson .....	1893
Brooks, George Washington .....	1879
Brundage, Albert Harrison .....	1892
Colen, James Austin .....	1892
Cutts, Foxwell Curtiss, Jr. ....	1875
Davis, William Mortimer .....	1879
DeForest, William Pendleton .....	1879
Dennin, Charles .....	1875
Dennin, Edwin Clinton .....	1892
Dewender, William Henry .....	1896
Douglass, Henry, Jr. ....	1875
Dunn, John Augustus .....	1867
Eccles, Robert Gibson .....	1885
FOUGERA, EDMUND CHARLES HENRY ..	1890
Haviland, Henry .....	1857
Krieger, Philip .....	1876
Lehn, Louis .....	1874
Levy, Adolph .....	1877
Livingston, Barent Van Buren .....	1872
McElhenie, Thomas Diamond .....	1872
Newman, George Anthony .....	1865
OWENS, RICHARD JOHN .....	1860
Pfeiffer, John .....	1893
Pyle, Cyrus .....	1859
Ray, Peter William .....	1892
Schimpf, Henry William .....	1894
Snyder, Ambrose Chancellor .....	1867
Squibb, Edward Hamilton .....	1882
SQUIBB, EDWARD ROBINSON .....	1858
Werner, Rudolph Carl .....	1892
Zellhoefer, George .....	1876

*Buffalo.*

Gregory, Willis George .....	1886
Hayes, Horace Phillips .....	1880
Lockie, James A. ....	1896
Peabody, William Huntington .....	1857
Rano, Charles Orlando .....	1866

*Catskill.*

Du Bois, William Laneman .....	1880
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*Corning.*

Cole, Victor Le Roy .....	1850
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*Croton-on-Hudson.*

Henry, Charles (Dwornciczak) .....	1881
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*Danmemora.*

Mason, Harry Beckwith .....	1896
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*Dunkirk.*

Davis, Eugene Miller .....1892

*Elmira.*

Holmes, Clay Wood.....1873

*Fillmore, Alleghany Co.*

Ridgway, Lemuel Augustus.....1882

*Fishkill-on-Hudson.*

Moith, Augustus Theodore .....1860

*Flushing.*

Hepburn, John.....1873

James, William Tefft .....1882

*Geneseo, Livingston Co.*

Rogers, Arthur Henry.....1882

*Gloversville, Fulton Co.*

Miller, Jason Albert.....1879

Van Auken, Jerrie A.....1880

*Gulton.*

Rhodes, Charles Orman .....1895

*Holley, Orleans Co.*

Bishop, Francis Myron .....1882

*Jamaica, Queens Co.*

Baylis, Lewis Fosdick .....1880

Goodale, Harvey Galusha.....1879

Peck, George Lyman.....1883

*Jamestown.*

Winnberg, John Magnus.....1892

*Middletown.*

KING, JAMES THEODORE.....1859

Rogers, William Henry.....1869

*Mount Vernon.*

Blackmore, Henry Spencer.....1896

Gill, George .....1872

*Newburgh.*

Chapman, Isaac Close .....1887

*New York City.*

Allison, William Outis.....1895

Alpers, William Charles .....1890

Amend, Bernard Gottwald .....1892

Amend, Otto Paul .....1892

Atwood, Herman White .....1873

Balser, Gustavus.....1875

Bendiner, Samuel Julius .....1882

Billings, Henry Merry.....1869

Boeddiker, Otto .....1895

Chandler, Charles Frederic.....1867

Coblentz, Virgil .....1882

Cook, Thomas Penrose .....1877

Ditman, Andrew Jackson .....1868

Elliott, Arthur Henry .....1892

Ewing, John .....1893

Fairchild, Benjamin Thomas.....1875

Fairchild, Samuel William .....1887

Fink, Frederick William.....1886

Fraser, Horatio Nelson.....1888

Gane, Eustace Harold.....1895

Gardner, Robert Winslow.....1867

Geisler, Joseph Frank .....1889

GRIFFITH, ALBERT RICHARD .....1870

Hauenstein, William .....1883

Haynes, David Oliphant.....1887

Heydenreich, Emile.....1867

*Hudnut, Alexander*.....1857

Jelliffe, Smith Ely .....1895

Jewell, Walter Hart.....1895

Jones, James Henry.....1892

Jungmann, Julius.....1879

Kalish, Julius .....1875

Keenan, Thomas John.....1894

Kemp, Edward.....1888

Kennedy, Ezra Joseph.....1887

Koles, Samuel Morse.....1890

Lampa, Robert Raymond.....1892

Lovis, Henry Christian .....1892

Main, Thomas Francis .....1872

Massey, William Morton.....1885

Mayo, Caswell Armstrong.....1893

McIntyre, Ewen.....1873

McKesson, George Clinton.....1888

McKesson, John, Jr. ....1867

MILHAU, EDWARD LEON .....1858

*Molwitz, Ernest*.....1867

Murray, Benjamin Lindley .....1896

O'Neil, Henry Maurice.....1879

Osmun, Charles Alvin .....1868

Peters, John Miller .....1896

Plaut, Albert.....1894

Pleasants, Charles Henry.....1890

Plummer, Edward .....1889

Quackinbush, Benjamin Franklin ....1886

RAMSPERGER, GUSTAVUS.....1860

Rice, Charles .....1870

Runyon, Edward Wheelock .....1875

Rusby, Henry Hurd.....1890

Sayre, Edward Augustus.....1877

Schieffelin, William Jay.....1892



Schmid, Henry.....1887  
 Schmidt, Ferdinand Traugott.....1886  
 SEABURY, GEORGE JOHN.....1876  
 Sieker, Ferdinand August.....1893  
 Skelly, James Joseph.....1866  
 Smith, Benjamin Franklin .....1892  
 Smith, Reuben Randolph.....1890  
 Stoff, Louis Ferdinand.....1892  
 Tscheppe, Adolph .....1876  
 Weinman, Oscar Christian .....1873  
 Wichelns, Frederick.....1881  
 Wickham, William Hull.....1870  
 Wilson, William.....1876

*Olean.*

Coon, James Van Deventer.....1880  
 Rich, Willis Simmons.....1882

*Oswego.*

Butler, Charles Henry.....1887

*Plattsburgh.*

Hitchcock, John E.....1892

*Port Chester.*

Hyler, William Henry.....1875

*Port Henry.*

Smith, Edward Salvister .....1890

*Port Jervis.*

Dedrick, William Frederick .....1884

*Potsdam.*

Thatcher, Hervey Dexter .....1865

*Richfield Springs.*

Smith, Willard Alfred.....1880

*Rochester.*

Paine, James Dixon .....1857

Schmitt, Joseph Max.....1882

*Rome.*

Owens, James Alanson .....1882

*Saratoga Springs.*

Fish, Charles Frederick.....1866

*Syracuse.*

Dawson, Edward Seymour, Jr .....1876

Snow, Charles Wesley.....1876

Webber, Joseph L.e Roy.....1886

*Tonawanda, Erie Co.*

Scoville, Charles Henry .....1882

*Troy.*

Pennington, Thomas Henry Sands...1877

*Utica.*

Blaikie, William.....1879

Cone, John Wright .....1876

Maine, August .....1892

*Wellsville, Alleghany Co.*

Hall, Edwin Bradford.....1879

*Yonkers.*

Eschman, Frederick William Rudolph.1880

Petsche, Franz Fred. Bismark Wilhelm.1892

Wray, George Brown .....1888

## NORTH CAROLINA.

*Asheville.*

Smith, Whitefoord Gamewell.....1892

*Burlington.*

Bradley, Augustus .....1894

*Charlotte.*

Wearn, William Henry.....1888

*Concord.*

Fetzer, Nevin Dieffenbacher.....1894

Johnson, Daniel Dudley .....1894

*Durham, Orange Co.*

Vaughan, Parry Wyche.....1882

Yearby, William Morgan.....1894

*Fayetteville.*

Sedberry, Bond English .....1882

*Franklin, Macon Co.*

Smith, Frank Taylor ... ..1894

*Greensboro.*

Mebane, Robert Sloan .....1894

*Henderson.*

Parker, Walter Wellington.....1894

*Littleton.*

Parrott, John Evans.....1890

*Maxton.*

Croom, James Dallas.....1890

*Oxford.*

Hancock, Franklin Willis.....1888

*Raleigh.*

Bobbitt, James Henry.....	1894
Hunter, Buxton Williams.....	1891
MacRae, John Young.....	1894
Simpson, William.....	1873

*Tarboro.*

Zoeller, Edward Victor.....	1878
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*Waynesville.*

Way, David.....	1894
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*Wilmington.*

Hardin, John Haywood.....	1881
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*Wilson.*

Hargrave, Benjamin Worthington....	1894
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## NORTH DAKOTA.

*Fargo.*

Christianson, Lars.....	1896
Day, George Alvah.....	1896

*Grafton.*

Haussamen, Henry Louis.....	1888
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*Jamestown.*

Davison, James.....	1895
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*Lisbon.*

Parker, William Stillman.....	1895
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*Valley City.*

Lee, Charles John.....	1896
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## OHIO.

*Akron.*

Smith, Joseph Stahle.....	1878
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*Berea, Cuyahoga Co.*

Noble, William Wesley.....	1893
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*Brooklyn Village.*

Schmidt, Carl.....	1891
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*Bryan.*

Snyder, Alva Leach.....	1873
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*Caldwell.*

Bowron, Walter Henry.....	1890
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*Cambridge.*

Ogier, John Morrison.....	1895
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*Cheviot.*

Hildreth, Newton Gough.....	1879
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*Chillicothe.*

Howson, Arthur Bayshawe.....	1886
Nippen, John Alvin.....	1879

*Cincinnati.*

Betz, Otto Edward.....	1887
De Lang, Alfred.....	1887
Eger, George.....	1864
Fennel, Charles Theodore Piderit ...	1886
Fieber, Gustavus Adolphus.....	1893
Gordon, William John Maclester ...	1854
Greve, Theodore Lund August.....	1864
Greyer, Julius.....	1880
Heinemann, Otto.....	1864
Hoffman, Julius.....	1887
Klayer, Louis.....	1884
Koehnken, Herman Henry.....	1875
Lehnkering, Charles Frederick.....	1893
Lloyd, John Uri.....	1870
Meininger, Albert.....	1881
Merrell, Charles George.....	1888
Merrell, George.....	1879
Phillips, Charles Wilson.....	1881
Ruppert, John.....	1880
Sauer, Louis Wendlin.....	1882
Schroeder, John Henry.....	1896
Serodino, Herman.....	1880
Simonson, William.....	1887
Vilter, Hermann Theodore.....	1881
Wagner, Henry.....	1876
Weeks, Benjamin Franklin.....	1891
Wetterstroem, Albert Frederick Charles.	1888
YORKSTON, MATTHEW MACKAY.....	1864
Zuenkeler, John Ferdinand.....	1887

*Cleveland.*

Acker, Philip.....	1889
Asplin, John Harding.....	1882
Aubley, Samuel.....	1888
Bartlett, John Augustus.....	1893
Bechberger, Henry.....	1893
Benfield, Charles William.....	1893
Bruce, James.....	1882
Cobb, Ralph Lathrop.....	1883
Deutsch, Julius William.....	1888
Dreher, Louis.....	1881
Elliott, Sidney Thomas.....	1893
Feil, Joseph.....	1885
Flood, William Henry.....	1892
Gegelein, Frederick Leonhardt.....	1881
Gleim, John Christopher.....	1893
Haake, William Henry.....	1893
Hannan, Owen Burdette.....	1893

Hechler, George Louis .....	1882	<i>Grand Rapids, Wood Co.</i>	
Hopp, Lewis Christopher .....	1876	Thurston, Azor .....	1886
Kieffer, George .....	1890	<i>Ironton.</i>	
Kuder, William Frank .....	1893	Sample, Elmer Winters .....	1894
Lane, Edward Baxter .....	1893	Winters, Aaron .....	1894
Lehr, Philip .....	1885	<i>Jefferson, Ashtabula Co.</i>	
May, Arthur Ferdinand .....	1881	Case, Charles Henry .....	1892
Meyer, William Victor .....	1893	<i>Lancaster.</i>	
Myers, Daniel .....	1882	Adamick, Gustave Hattenhauer .....	1891
Rosewater, Nathan .....	1880	<i>Lane, Lake Co.</i>	
Schellentrager, Ernst August .....	1882	Biddle, Herbert George .....	1888
Schoenhut, Christian Henry .....	1888	<i>Logan.</i>	
Selzer, Eugene Reinhold .....	1893	Harrington, Frank .....	1869
Sherwood, Henry Jackson .....	1894	<i>Massillon, Stark Co.</i>	
Sords, Thomas Vincent .....	1893	Baltzly, Zachariah Taylor .....	1876
Stecher, Henry William .....	1895	Kirchhofer, Peter Paul .....	1881
Urban, Jacob Philip .....	1881	<i>Middletown.</i>	
Voss, George William .....	1885	Johnson, Charles Brayton .....	1876
<i>Columbiana.</i>		<i>Navarre.</i>	
Ink, Charles Elliott .....	1885	GROSSKLAUS, JOHN FERDINAND .....	1859
<i>Columbus.</i>		<i>Norwood, Hamilton Co.</i>	
Bruck, Philip Henry .....	1884	Weyer, John .....	1887
Byrne, John .....	1894	<i>Salem, Columbiana Co.</i>	
Hatton, Edgar Melville .....	1878	Hawkins, Michael Smith .....	1870
Hatton, Ellmore Wright .....	1894	<i>Scio.</i>	
Herbst, Frederick William .....	1882	Beal, James Hartley .....	1892
Huston, Charles .....	1872	<i>Springfield.</i>	
Karb, George James .....	1883	Casper, Thomas Jefferson .....	1867
Kauffman, George Beecher .....	1882	Lisle, Justin Dickson .....	1894
Rauschkolb, John .....	1894	Siegenthaler, Harvey N. ....	1882
Schuessler, Ernst .....	1881	<i>Troy.</i>	
Schuessler, Frederick William .....	1880	Tobey, Charles William .....	1879
Sherwood, Louis Walker .....	1882	<i>Wooster.</i>	
<i>Conneaut, Ashtabula Co.</i>		Ohliger, Lewis Philip .....	1871
Symonds, Arthur Henry .....	1892	<i>OKLAHOMA TERRITORY.</i>	
<i>Dayton.</i>		<i>El Reno.</i>	
Burkhardt, Mark Anthony .....	1887	Sombart, John Edward .....	1881
Kurfurst, Henry Ferdinand .....	1881	<i>OREGON.</i>	
Spengler, John George .....	1887	<i>Ashland.</i>	
<i>Delaware.</i>		Sherwin, Eugene Alonzo .....	1889
Pfiffner, Fritz John R. ....	1894		
<i>East Liverpool, Colorado Co.</i>			
Albright, Emmet Cyrus .....	1894		
<i>Findlay.</i>			
Firmin, John Curtis .....	1893		
<i>Glendale, Hamilton Co.</i>			
Feemster, Joseph Hall .....	1873		

*Portland.*

Blumauer, Louis.....	1889
Dietrich, Howard Dickson.....	1889
Pfunder, William .....	1889

*The Dalles.*

Blakeley, George Clarence.....	1892
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*Woods, Tillamook Co.*

Linton, Charles Elsworth .....	1899
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## PENNSYLVANIA.

*Allegheny City.*

Eggers, Frederick Hermann.....	1872
Slocum, Frank Leroy .....	1880

*Beaver, Beaver Co.*

Andriessen, Hugo .....	1875
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*Bristol.*

Young, John Kroesen.....	1887
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*Carlisle.*

Horn, Wilbur Fisk.....	1876
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*Chambersburg.*

Crawford, Walter Beatty, Jr.....	1891
Keefer, Charles DeWalt.....	1891

*Coatesville.*

Kenworthy, John.....	1895
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*Connellsville.*

Berryhill, Henry Pennick.....	1890
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*Franklin.*

Rieseman, Joseph .....	1883
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*Harrisburg.*

George, Charles Theodore .....	1873
Gorgas, George Albert.....	1884
Gross, Edward Ziegler.....	1883
Miller, Jacob Augustus .....	1873

*Haverford.*

Harbaugh, Wilson Linn.....	1896
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*Honesdale.*

Leine, Arthur Moritz.....	1895
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*Lancaster.*

HEINITSH, CHARLES AUGTSTUS.....	1857
Heinitsh, Sigmund William.....	1889

*Lebanon.*

LEMBERGER, JOSEPH LYON.....	1858
Redsecker, Jacob Henry.....	1881

*Linesville.*

Allen, E. Floyd.....	1885
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*Lock Haven.*

Prieson, Adolph.....	1880
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*Minersville.*

Burns, John Kellar.....	1876
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*Mt. Pleasant, Westmoreland Co.*

McElwee, Emer Judson .....	1888
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*Norristown.*

Reed, Willoughby Henry.....	1893
Stahler, William.....	1880

*North Wales.*

Childs, William Rhoads.....	1896
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*Orwigsburg, Schuylkill Co.*

Binkley, George K.....	1892
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*Philadelphia.*

Bastin, Edson Sewell.....	1895
Bauer, Louis Gustavus.....	1867
Blair, Henry Cowen.....	1868
Borell, Henry Augustus .....	1874
BORING, EDWIN MCCURDY.....	1867
<i>Bullock, Charles</i> .....	1857
Burg, John Dellinger.....	1888
Cuthbert, Richard William.....	1893
Danner, William Edward .....	1896
De Graffe, Bertha Leon.....	1895
Dobbins, Edwards Tompkins .....	1867
Eddy, Henry Clay.....	1869
<i>Ellis, Evan Tyson</i> .....	1857
England, Joseph Winters.....	1893
Fox, Peter Paul.....	1869
French, Harry Banks.....	1890
Gano, William Hubbell .....	1892
Gerhard, Samuel .....	1873
<i>Grahame, Israel Janney</i> .....	1856
HANCE, EDWARD HANCE .....	1857
Hassinger, Samuel Ellphat Reed.....	1880
Hausmann, Frederick William.....	1895
<i>Heintzelman, Joseph Augustus</i> .....	1858
Hoch, Aquila .....	1896
Holland, George .....	1894
Hunter, Henry Blount.....	1894
<i>Jenks, William Jenks</i> .....	1858
Jones, Alexander Henry.....	1874
Kebler, Lyman Frederic.....	1894
Keeney, Caleb Reynolds.....	1868
Kline, Mahlon Norwood.....	1878

Koch, Louis .....	1872
Krewson, William Egbert .....	1875
LaWall, Charles Herbert .....	1896
Lowe, Clement Belton .....	1895
Maisch, Henry Charles Christian .....	1885
Marshall, Rush Porter .....	1893
McIntyre, William .....	1868
<i>Mellor, Alfred</i> .....	1864
MILLER, ADOLPH WILLIAM .....	1868
Milligan, Decatur .....	1867
MOORE, JOACHIM BONAPARTE .....	1860
Morison, John Louis Dales .....	1895
Morris, Lemuel Iorwerth .....	1880
Mulford, Henry Kendall .....	1896
Newbold, Thomas Mitchell .....	1876
Ogden, John .....	1890
Ottinger, James Jeremiah .....	1876
Peacock, Josiah Comegys .....	1892
<i>Perot, Thomas Morris</i> .....	1857
Pile, Gustavus .....	1881
Potts, David Gardiner .....	1893
Preston, David .....	1868
Procter, Wallace .....	1874
REMINGTON, JOSEPH PRICE .....	1867
Richter, Gustave Adolph .....	1890
<i>Rittenhouse, Henry Norman</i> .....	1857
ROSENGARTEN, MITCHELL GEORGE .....	1869
Ryan, Frank Gibbs .....	1892
Sadtler, Samuel Philip .....	1893
Shafer, Erwin Clement .....	1893
SHINN, JAMES THORNTON .....	1860
Shoemaker, Richard Martin .....	1869
Stedem, Frederick Will. Edward .....	1892
<i>Taylor, Alfred Bower</i> .....	1852
<i>Thompson, William Beatty</i> .....	1858
Trimble, Henry .....	1876
<i>Warner, William Richard</i> .....	1857
Webb, William Henry .....	1867
Weidemann, Charles Alexander .....	1868
Wendell, Henry Edward .....	1873
<i>Wiegand, Thomas Snowdon</i> .....	1857
ZEILIN, JOHN HENRY .....	1859

*Pittsburgh.*

Emanuel, Louis ....	1878
Finley, Arthur Ardon Chapman .....	1890
Hays, Joseph Anthony .....	1892
Henderson, Archibald Keys .....	1888
Holland, Samuel Smith .....	1876
Kelly, George Armstrong .....	1882
Koch, Julius Arnold .....	1892
Nisbet, William Washington .....	1883

*Pottsville.*

Diebert, Thomas Irvin .....	1882
Kennedy, George Washington .....	1869

*Reading.*

Weida, Charles Arthur .....	1896
Ziegler, Philip Milton .....	1867

*Schuylkill Haven.*

F.T.B

Comings, Charles Samuel .....	1888
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*Shamokin.*

Smink, Robert William .....	1893
Smink, William Henry R. ....	1885

*Towanda.*

Porter, Henry Carroll .....	1880
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*Warren.*

Dixson, Frederick Hartly .....	1892
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*West Chester.*

Evans, Joseph Spragg .....	1877
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*White Haven.*

Driggs, Charles M. ....	1881
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*Williamsport.*

Cornell, Edward Augustus .....	1873
Duble, Jesse Balderston .....	1870

*York.*

Patton, John Franklin .....	1880
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## RHODE ISLAND.

*Narragansett Pier.*

Tobin, John Martin .....	1887
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*Newport.*

Cole, Charles Mowry .....	1888
Cotton, William Henry .....	1885
Downing, Benjamin Franklin, Jr. ....	1886
Huntington, William Hunter .....	1891

*Providence.*

Blanding, William Oliver .....	1894
CALDER, ALBERT LAYTON .....	1859
Cates, William Everett .....	1888
Danforth, Edmund Culver .....	1878
Fenner, Alexander Wilson .....	1888
Gilbert, Charles Atwood .....	1891
Greene, William Ray .....	1883
Hardy, Cyrus Daniel .....	1891
O'Hare, James .....	1888
Pearce, Howard Anthony .....	1894

Potter, William Robert.....1894  
 Reynolds, William Keys .....1876  
 Wood, Mason Bowen .....1882

*Westerly.*

Collins, Albert Burlingame.....1882

SOUTH CAROLINA.

*Anderson.*

Wilhite, Frank Turner .....1893

*Charleston.*

Aimar, Charles Pons .....1879  
 Burnham, Edward Steinmeyer .....1874  
 Marsteller, George Ludwig .....1883  
 Plenge, Henry Charles.....1894

*Columbia.*

Thomas, Oscar Ernest.....1882

*Newberry.*

Robertson, Peter .....1896

SOUTH DAKOTA.

*Lake Preston, Kingsbury Co.*

Keith, Irwin Alonzo.....1892

*Sioux Falls.*

Ayer, Charles Foster .....1891

*Tyndall.*

Cotton, Robert M. ....1893

*Watertown.*

Jones, David Franklin.....1895

*Yankton.*

Brecht, Frederick Adolph.....1895  
 Tammen, George .....1895

TENNESSEE.

*Bristol.*

Bunting, Lindsay ... ..1890

*Chattanooga.*

Greve, Charles Mathias.....1887  
 Stong, Franz Sigel.....1894  
 Voigt, Joseph Frederick .....1893

*Clarksville.*

Bradley, Charles I arkin .....1894  
 Lockert, Charles Lacy.....1894

*Columbia.*

Rains, Aris Brown.....1894

*Covington.*

Jacocks, John Thomas .....1894

*Harriman.*

Kline, Charles Grant.....1894

*Knoxville.*

Gooding, Charles John .....1892  
 Rosenthal, David Abraham .....1894

*Memphis.*

ROBINSON, JAMES SCOTT.....1869  
 Treherne, John Curtis .....1894

*Murfreesboro.*

Vickers, Rufus William.....1894

*Nashville.*

Blackman, William Marshall .....1896  
 Bloomstein, Max .....1896  
 Burge, James Oscar .....1878  
 Davis, Edward Benjamin .....1896  
 McGill, John Thomas .....1895  
 Page, David Samuel .....1896  
 Ruddiman, Edsel Alexander.....1894  
 Thomas, James.....1896

*Tullahoma.*

Conger, Iliff .....1891

TEXAS.

*Athens.*

La Rue, William Isaac .....1892

*Dallas.*

De Lorenzi, Albert .....1890  
 Eberle, Eugene Gustavus .....1896  
 Keene, Thomas Rucker .....1888  
 Klauber, Charles Nathaniel .....1891  
 Schweickhardt, Richard .....1890

*El Paso.*

Irvin, William Armstrong.....1879

*Galveston.*

Orton, Ingomar Francois .....1891

*Granbury, Hood Co.*

Morgan, Eugene Hilliard .....1892

*Houston.*

Burgheim, Jacob .....1892  
 Cunningham, Henrietta Manlove ....1894

*Paris.*

Greiner, William Edward .....1892

<i>Rockwall.</i>		<i>Richmond.</i>	
Vance, James Walter.....	1895	Baker, Thomas Roberts.....	1873
<i>San Antonio.</i>		Briggs, Andrew Gessner.....	1890
Cohn, Richard.....	1892	Harrison, Richard Heth Munford....	1895
Schmitt, George Joseph Francis.....	1890	Miller, Polk.....	1894
<i>Taylor.</i>		Miller, Turner Ashby.....	1854
Thames, Joseph Jefferson.....	1895	Scott, William Henry.....	1873
<i>Tyler.</i>		WASHINGTON.	
Gee, Charlie.....	1893	<i>Castle Rock.</i>	
<i>Van Alstyne.</i>		Hille, David Johnson.....	1893
Neathery, James Miller.....	1892	<i>La Connor, Skagit Co.</i>	
UTAH.		Joergensen, Gerhard Johan Carl Sophus.	1889
<i>Park City.</i>		<i>Pullman.</i>	
Brother, William.....	1892	Watt, George Henry.....	1896
<i>Salt Lake City.</i>		<i>Seattle.</i>	
Druehl, Frank August.....	1889	Holmes, Henry Elliott.....	1880
Franken, James Latinnes.....	1892	<i>Snohomish.</i>	
Hill, Frederick John.....	1895	Wilbur, Lot.....	1896
VERMONT.		<i>Tacoma.</i>	
<i>Brandon.</i>		<i>Cummings, Henry Thornton.....</i>	1853
Crossman, George Alvin.....	1872	Stewart, Andrew Morley.....	1896
<i>Rutland.</i>		<i>Walla Walla.</i>	
Higgins, Albert Warren.....	1895	Mason, George L.....	1895
<i>St. Albans.</i>		WEST VIRGINIA.	
Dutcher, Alfred Luther.....	1892	<i>Charleston, Kanawha Co.</i>	
<i>St. Johnsbury.</i>		Boggs, Edwin Leslie.....	1872
Bingham, Charles Calvin.....	1875	<i>Wheeling.</i>	
VIRGINIA.		Williams, William Hudson.....	1880
<i>Charlottesville.</i>		WISCONSIN.	
Wills, Frederick Miles.....	1890	<i>Black River Falls.</i>	
<i>Danville.</i>		Werner, Benjamin Charlie.....	1895
Cole, Howson White.....	1882	<i>Eau Claire.</i>	
<i>Falls Church.</i>		Blestren, Hans Markus Gunerius.....	1889
Church, Merton Elbridge.....	1892	<i>Fountain City.</i>	
<i>Fredericksburg.</i>		Bechman, Charles Richard.....	1882
Hall, Horace Byrd.....	1896	<i>La Crosse.</i>	
<i>Leesburg.</i>		Beyschlag, Charles.....	1880
Purcell, Nicholas Sidney.....	1890	<i>Madison.</i>	
		Bernhard, Charles Henry.....	1888
		Kremers, Edward.....	1887

<i>Mayville, Dodge Co.</i>		<i>Neillsville.</i>	
Sauerhering, Rudolph Aurelius .....	1884	Sniteman, Charles Clarence .....	1881
<i>Milwaukee.</i>			
Conrath, Adam .....	1881	WYOMING.	
Dadd, Robert Morrow .....	1896	<i>Rawlins.</i>	
DRAKE, JOHN RANSOM .....	1860	Stuver, Emanuel .....	1895
Kettler, Edward, Jr. ....	1896	<i>Rock Springs.</i>	
Kienth, Hans .....	1884	Daus, Leopold Louis .....	1895
Ruenzel, Henry Gottlieb .....	1892		
Schrank, Charles Henry .....	1876		

BERMUDA.

*Hamilton.*

<i>Heyl, James Bell</i> .....	1863
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DOMINION OF CANADA.

NEW BRUNSWICK.

*St. John.*

Coupe, Robert Edward .....	1894
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NOVA SCOTIA.

*Halifax.*

Simson, Francis Cook .....	1876
Simson, William Amore .....	1894

ONTARIO.

*Hamilton.*

Clark, John Alexander .....	1890
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*Ottawa.*

SAUNDERS, WILLIAM .....	1860
Watters, Henry .....	1896

*St. Thomas.*

Foster, William Orrville .....	1881
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*Stratford.*

Waugh, George James .....	1862
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*Toronto.*

Flett, Frederick William .....	1895
Heebner, Charles Frederick .....	1894
Holgate, Francis Heasell .....	1895
Lander, John Cambridge .....	1877
Lowden, John .....	1875
Robinson, Ernest Frankish .....	1889

*Windsor.*

D'Avignon, John Eugene .....	1888
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PRINCE EDWARD ISLAND.

*Charlottetown.*

Dodd, Simon Walker .....	1884
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QUBEC.

*Montreal.*

Baridon, Louis Richard .....	1890
Chapman, William Henry .....	1895
Décary, Louis Arthur .....	1895
Gray, Henry Robert .....	1867
Howey, John Joseph .....	1896
Lachance, Seraphin .....	1888
Lañtot, Henri Raymond .....	1894
Lecours, Joseph Edouard Wilfrid .....	1896
Macmillan, Alexander Morrison .....	1896
Miles, Henry .....	1896
Morrison, Joseph Edward .....	1888
Muir, Ebenezer .....	1895
Reed, Thomas Dennis .....	1896
Tremble, John Edward .....	1896

*Quebec.*

Roy, Joseph Auguste Emile .....	1896
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*Three Rivers.*

Williams, Richard Wellington .....	1883
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HAWAIIAN ISLANDS.

*Honolulu.*

Lyons, Albert Byron .....	1885
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## MEXICO.

*Monterey.*

Egeling, Berthold Frederick Gustavus.....1893

## MEMBERS RESIDING IN EUROPE.

Hoffmann, Frederick, Leipzig, Germany.....1867

Martin, Nicholas Henry, Newcastle upon Tyne, England.....1891

Power, Frederick Belding, London, England.....1872

WELLCOME, HENRY SOLOMON, London, England .....1875

## MEMBERS WHOSE RESIDENCE IS UNKNOWN.

Apel, Frederick Edmond .....1862

Christian, John Fleming.....1894

Harper, Harry Winston .....1881

*Leitch, Arthur*.....1860

*McConville, Thomas Aloysius*.....1864

*McPherson, George*.....1865

Odell, Willis Butler... ..1893

*Wardell, Robert C*.....1860

Woods, George Dana .....1895

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Hammond, La.
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Main & 1st sts., Richmond, Va.
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Prescott, Ariz.
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361 Main st., Woburn, Mass.

- Brooks, George W.,  
1161 Myrtle ave., Brooklyn, N. Y.
- Brotner, William,  
Main st., Park City, Utah.
- Brown, Albert E.,  
55 St. Michael st., Mobile, Ala.
- Brown, Henry J.,  
2 Main st., Ann Arbor, Mich.
- Brown, Robert J.,  
113 Delaware st., Leavenworth, Kan.
- Brown, William A.,  
Eagle Drug Store, Winnemucca, Nev.
- Brown, William T.,  
Box 19, Madison, N. J.
- Bruce, James,  
544 Prospect st., Cleveland, O.
- Bruck, Philip H.,  
961 S. High st., Columbus, O.
- Bruguier, Francis,  
Hamburg Place & Lafayette st., Newark, N. J.
- Brundage, Albert H.,  
1153 Gates ave., Brooklyn, N. Y.
- Brundage, Fred.,  
21 Terrace st., Muskegon, Mich.
- Brunner, Chas. H.,  
148 6th st., Fremont, Neb.
- Brunner, Norman I.,  
4th & Arch sts., Macon, Ga.
- Buchheit, Aug. W.,  
119 W. 3d st., Grand Island, Neb.
- BUCK, JOHN,  
276 Broadway, Chelsea, Mass.
- Buck, John I.,  
276 Broadway, Chelsea, Mass.
- Bullock, Charles,*  
528 Arch st., Philadelphia, Pa.
- Bunker, Elihu,  
403 Purchase st., New Bedford, Mass.
- Bunting, Lindsay,  
Main st., Bristol, Tenn.
- Burg, John D.,  
4th & Brown sts., Philadelphia, Pa.
- Burge, James O.,  
Church & High sts., Nashville, Tenn.
- Burghelm, Jacob,  
1019 Congress ave., Houston, Tex.
- Burkhardt, Mark A.,  
Third & St. Clair sts., Dayton, O.
- Burnham, Alfred A., Jr.,  
459 Dudley st., Boston, Mass.
- Burnham, Edward S.,  
369 King st., Charleston, S. C.
- Burns, J. Kellar,  
Sunbury & Lecona sts., Minersville, Pa.
- Burrill, John W.,  
68 Court st., Auburn, Me.
- Burrough, Horace,  
509 W. Lombard st., Baltimore, Md.
- Burton, Wm. A.,  
501 Main st., Athol, Mass.
- Butler, Charles H.,  
182 W. 1st st., Oswego, N. Y.
- Butler, Freeman H.,  
141 Central st., Lowell, Mass.
- Button, Charles E.,  
744 W. Van Buren st., Chicago, Ill.
- Byrne, John,  
200 N. High st., Columbus, O.
- CALDER, ALBERT L.,  
183 N. Main st., Providence, R. I.
- Caldwell, James W.,  
242 Grand River ave., Detroit, Mich.
- Calvert, John,  
Kearney & Clay sts., San Francisco, Cal.
- Cambier, Jacob,  
1000 Abriendo ave., Pueblo, Colo.
- CANDIDUS, PHILIP C.,  
Mobile, Ala.
- CANNING, HENRY,  
109 Green st., Boston, Mass.
- Capdau, Pierre A.,  
Elysianfield & Rampart sts., New Orleans, La.
- Capper, William E.,  
278 Dartmouth st., Boston, Mass.
- Carr, Jerome C.,  
3 East Main st., Du Quoin, Ill.
- Carr, Will. I.,  
334 Central ave., Hot Springs, Ark.
- Carrell, Eugene A.,  
South st., Morristown, N. J.
- Carlsake, George M.,  
Farnsworth ave., Bordentown, N. J.
- Carter, Frank H.,  
300 Massachusetts ave., Indianapolis, Ind.
- Carton, John A.,  
Britt, Hancock co., Ind.
- Carver, Frank H.,  
Main st., Plymouth, Mass.
- Case, Charles H.,  
Jefferson, Ashtabula co., O.
- Caspari, Charles, Jr.,  
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- Casper, Thomas J.,  
41 E. Main st., Springfield, O.

- Cates, William E.,  
     245 Prairie ave., Providence, R. I.  
 Chabot, David P.,  
     Jewett City, Conn.  
 Chalin, Louis F.,  
 Carrolton & St. Chas. aves., New Orleans, La.  
 Chandler, Charles F.,  
     41 E. 49th st., New York, N. Y.  
 Chapin, Fred. H.,  
     259 Main St., Hartford, Conn.  
 Chapin, William A.,  
     Beach & Lincoln sts., Boston, Mass.  
 Chapman, Isaac C.,  
     111 Water st., Newburgh, N. Y.  
 Chapman, William H.,  
     2637 St. Catharine st., Montreal, Can.  
 Charroppin, Emile L.,  
     Port Allen, I. A.  
 Cheatham, Thomas A.,  
     Mulberry & 3d sts., Macon, Ga.  
 Childs, Wm. R.,  
     Main & Walnut sts., North Wales, Pa.  
 Christian, John F.,  
     Residence Unknown.  
 Christiani, Charles,  
     484 Pennsylvania ave., Washington, D. C.  
 Christianson, Lars,  
     402 Front st., Fargo, N. Dak.  
 Church, Merton E.,  
     Falls Church, Va.  
 Clafin, Walter A.,  
     Harvard Sq., Cambridge, Mass.  
 Clark, James R.,  
     502 Francis st., St. Joseph, Mo.  
 Clark, John A.,  
     Fast King st., Hamilton, Ontario, Can.  
 Clowes, William L.,  
     Manzanola, Colo.  
 Cobb, Ralph L.,  
     112 Superior st., Cleveland, O.  
 Coblentz, Joe. Dan.,  
     467 Florida ave., N. W., Washington, D. C.  
 Coblentz, Virgil,  
     115 W. 68th st., New York, N. Y.  
 Cogan, Denis S.,  
     320 Congress st., Portland, Me.  
 Cohn, Richard,  
     816 W. Commerce st., San Antonio, Tex.  
 Colburn, Jesse M.,  
     7th & Main sts., Little Rock, Ark.  
 Cole, Allen M.,  
     88 S. C. st., Virginia City, Nev.  
 Cole, Charles M.,  
     302 Thames st., Newport, R. I.  
 Cole, Howson W.,  
     429 Main st., Danville, Va.  
 Cole, Victor I.,  
     22 East Market st., Corning, N. Y.  
 Colen, James A.,  
     383 Court st., Brooklyn, N. Y.  
 Colgan, John,  
     10th & Walnut sts., Louisville, Ky.  
 Collins, Albert B.,  
     48 Main st., Westerly, R. I.  
 Collins, Carrie S.,  
     State st., Garner, Hancock co., Ia.  
 Colton, James B.,  
     766 Tremont st., Boston, Mass.  
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     Main & St. Peter sts., Schuylkill Haven, Pa.  
 Cone, Alfred G.,  
     1 Bridge st., Haydenville, Mass.  
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     205 Genesee st., Utica, N. Y.  
 Conger, Iliff,  
     Tullahoma, Tenn.  
 Conrad, John,  
     239 State st., Chicago, Ill.  
 Conrath, Adam,  
     630 Chestnut st., Milwaukee, Wis.  
 Constantine, Edward R.,  
     200 W. Green st., Louisville, Ky.  
 Cook, Gilbert S.,  
     Somerville, N. J.  
 Cook, Thomas P.,  
     114 William st., New York, N. Y.  
 Coon, James V. D.,  
     111 Union st., Olean, N. Y.  
 Copeland, Sidney F.,  
     392 Boylston st., Boston, Mass.  
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     1022 E. 9th st., Kansas City, Mo.  
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     Pine & 4th sts., Williamsport, Pa.  
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     Darien, Ga.  
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*Dennin, Edwin C.*,  
 383 Court st., Brooklyn, N. Y.  
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*Diebert, Thomas I.*,  
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*Diehl, C. Lewis*,  
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 Pratt & Howard sts., Baltimore, Md.  
*Dohme, Charles E.*,  
 Pratt & Howard sts., Baltimore, Md.  
*DOHME, LOUIS*,  
 Pratt & Howard sts., Baltimore, Md.  
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 Freeman, Cass co., Mo.  
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 Bonnet Carré, La.  
*Dorner, Emil A.*,  
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*Dorr, George W.*,  
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 204 Main st., Little Rock, Ark.  
*Downing, Benjamin F., Jr.*,  
 42 Broadway, Newport, R. I.  
*Downing, Lucien B.*,  
 Hanover, N. H.  
*Drake, Frederick T.*,  
 9 Washington st., Stoneham, Mass.  
*DRAKE, JOHN R.*,  
 365 East Water st., Milwaukee, Wis.  
*Dreher, Louis*,  
 302 Euclid ave., Cleveland, O.  
*Dresser, George E.*,  
 Main st., Putnam, Conn.  
*Drew, Walter I.*,  
 202 Brackett st., Portland, Me.  
*Driggs, Charles M.*,  
 Railroad & Berwick sts., White Haven, Pa.  
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 Main & 3d South sts., Salt Lake City, Utah.  
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 Chester ave., Bakersfield, Kern co., Cal.  
*DRURY, LINUS D.*,  
 Warren & Dudley sts., Boston, Mass.

- Duble, Jesse B.,  
Pine & 4th sts., Williamsport, Pa.
- Du Bois, William L.,  
281 Main st., Catskill, N. Y.
- Duckett, Walter G.,  
22d st. & Penna. ave., Washington, D. C.
- Duggan, James,  
50 Main st., Norwich, Conn.
- Dunham, Henry B.,  
12 Copeland st., Boston, Mass.
- Dunn, John A.,  
36 Doughty st., Brooklyn, N. Y.
- Dunwoody, Richard G.,  
369 Piedmont ave., Atlanta, Ga.
- Dupont, William,  
182 Michigan ave., Detroit, Mich.
- Dupuy, Eugene,*  
540 Halsey st., Brooklyn, N. Y.
- Durban, Sebastian C.,  
708 Broad st., Augusta, Ga.
- Durkee, William C.,  
392 Boylston st., Boston, Mass.
- Dutcher, Alfred L.,  
109 Main st., St. Albans, Vt.
- Eads, Robert I.,  
100 E. New York st., Indianapolis, Ind.
- Eagney, James T.,  
126 Grand ave., New Haven, Conn.
- Earl, Noble C.,  
Middle & Free sts., Portland, Me.
- Easterday, Herbert C.,  
700 New Jersey av. N. W., Washington, D. C.
- Eberbach, Ottmar,  
12 South Main st., Ann Arbor, Mich.
- Eberle, Eugene G.,  
Care Texas Drug Co., Dallas, Tex.
- EBERT, ALBERT E.,  
426 State st., Chicago, Ill.
- Eccles, Robert G.,  
191 Dean st., Brooklyn, N. Y.
- Eckford, Joseph Wm.,  
Commerce st., Aberdeen, Miss.
- Eckstein, Andrew J.,  
125 N. Minnesota st., New Ulm, Minn.
- Eddy, Henry C.,  
18th & Lombard sts., Philadelphia, Pa.
- Edwards, Frederick B.,  
55 Farmington ave., Hartford, Conn.
- Edwards, Nathan W.,  
Main st., Fairmount, Ind.
- Egeling, B. F. Gustavus,  
Botica del Leon, Monterey, Mexico.
- Eger, George,  
839 Central ave., Cincinnati, O.
- Eggers, Frederick H.,  
172 E. Ohio st., Allegheny City, Pa.
- Ehrlicher, Henry M.,  
334 Court st., Pekin, Ill.
- Eichrodt, Charles W.,  
503 North West st., Indianapolis, Ind.
- Ekman, N. Adolf,  
Oroville, Cal.
- Elbe, Constantine B.,  
Long Beach, Los Angeles co., Cal.
- Eliel, Leo,  
101 Main st., South Bend, Ind.
- Elliott, Arthur H.,  
115 West 68th st., New York, N. Y.
- ELLIOTT, HENRY A.,  
673 W. Lexington st., Baltimore, Md.
- Elliott, Sidney T.,  
32 John st., Cleveland, O.
- Ellis, Evan T.,*  
335 S. 18th st., Philadelphia, Pa.
- Emanuel, Louis,  
2d ave. & Grant st., Pittsburgh, Pa.
- Emich, Columbus V.,  
423 N. Howard st., Baltimore, Md.
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- Fairchild, Samuel W.,  
84 Fulton st., New York, N. Y.
- Farrar, Samuel R.,  
Opera House Block, Lebanon, Mo.
- Fay, Hamilton,  
Pacific ave., Santa Cruz, Cal.
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- Feil, Joseph,  
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- Feldkamp, Chas. L.,  
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- Fetzer, Nevin D.,  
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- Fieber, Gustavus A.,  
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- Field, Claud,  
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- Field, James C.,  
38 W. Main st., Somerville, N. J.
- Fink, Frederick Wm.,  
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- Finlay, Alexander K.,  
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- Finley, Arthur C.,  
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- Fish, Frederic W.,  
Orange, Mass.
- Fisher, Elbert E.,  
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- Fisher, George W.,  
De Land, Fla.
- Flanagan, Lewis C.,  
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- Fleischer, Adolph T.,  
296 N. Market st., Chicago, Ill.
- Fleischmann, Augustus T.,  
4th and Ohio st., Sedalia, Mo.
- Flemer, Lewis,  
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- Fletcher, John W.,  
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- Flett, Frederick W.,  
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221 Talbot st., St. Thomas, Ontario, Can.
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- Gale, William H.,  
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- Galt, Edward P.,  
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- Gammon, Irving P.,  
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- Gee, Charlie,  
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449 St. Charles st., New Orleans, La.
- Graner, William,  
470 Baronne st., New Orleans, La.
- Grassly, Charles W.,  
287 W. 12th st., Chicago, Ill.

- Gray, Henry R.,  
122 St. Lawrence st., Montreal, Can.
- Gray, William,  
843 Fulton st., Chicago, Ill.
- Green, Benjamin,  
12 Market Square, Portsmouth, N. H.
- Green, Hamer H.,  
220 N. Centre st., Bloomington, Ill.
- Greene, William R.,  
1 Westminster st., Providence, R. I.
- Gregory, Willis G.,  
530 Main st., Buffalo, N. Y.
- Greiner, William E.,  
104 N. Side Sq., Paris, Tex.
- Greve, Charles M.,  
6th & Market sts., Chattanooga, Tenn.
- Greve, Theodore L. A.,  
John & 6th sts., Cincinnati, O.
- Greyer, Julius,  
Vine & Findlay sts., Cincinnati, O.
- Griffen, Truman,  
101 Washington ave. S., Minneapolis, Minn.
- GRIFFITH, ALBERT R.,  
2241 3d ave., New York, N. Y.
- Gross, Edward Z.,  
119 Market st., Harrisburg, Pa.
- GROSSKLAUS, JOHN F.,  
High st. & Public Square, Navarre, O.
- Grossman, Edward L.,  
410 Kearney st., San Francisco, Cal.
- Grosvenor, Daniel P.,  
35 Main st., Peabody, Mass.
- Gundrum, George,  
Ionia, Mich.
- Haake, William H.,  
795 Central ave., Cleveland, O.
- Hale, Chester S.,  
974 Main st., Worcester, Mass.
- Hall, Alden T.,  
362 St. Peter st., St. Paul, Minn.
- Hall, Edwin B.,  
173 Main st., Wellsville, Allegheny co., N. Y.
- Hall, Horace B.,  
Main & Commerce sts., Fredericksburg, Va.
- Hall, Nettie C.,  
Fitzgerald, Ga.
- Hall, William A.,  
Cass & Lafayette sts., Greenville, Mich.
- Hallberg, Carl S. N.,  
358 Dearborn st., Chicago, Ill.
- Hamlin, James A.,  
716 Massachusetts st., Lawrence, Kan.
- HANCE, EDWARD H.,  
Callowhill & Marshall sts., Phila., Pa.
- Hancock, Franklin W.,  
Oxford, N. C.
- Hancock, John F.,  
4 South Howard st., Baltimore, Md.
- Hancock, J. Henry,  
800 W. Lombard st., Baltimore, Md.
- Hannan, Owen B.,  
693 Cedar ave., Cleveland, O.
- Harbaugh, Wilson L.,  
Haverford, Montgomery co., Pa.
- Hardigg, William L.,  
2d, near Main st., Uniontown, Ky.
- Hardin, John H.,  
124 Front st., Wilmington, N. C.
- Harding, Lawrence A.,  
16 E. 7th st., St. Paul, Minn.
- Hardy, Cyrus D.,  
86 Weybosset st., Providence, R. I.
- Hargrave, Benj. W.,  
Nasby st., Wilson, N. C.
- HARLOW, NOAH S.,  
4 Smith's Block, Bangor, Me.
- Harper, Harry W.,  
Residence Unknown.
- Harrah, John W.,  
1718 4th ave., S., Minneapolis, Minn.
- Harrington, Frank,  
Main & Market sts., Logan, O.
- Harris, Francis M.,  
814 Main st., Worcester, Mass.
- Harrison, Jacob H.,  
305 Brady st., Davenport, Ia.
- Harrison, Richard H. M.,  
Broad & Foushee sts., Richmond, Va.
- Harrison, Wm. J.,  
Main st. & Clifton ave., Lakewood, N. J.
- Harter, Isaac F.,  
Stronghurst, Ill.
- Hartnett, Eugene,  
105 Montgomery st., Jersey City, N. J.
- Hartshorn, Frederick A.,  
15 Mechanics' st., Marlborough, Mass.
- Hartwig, Charles F.,  
476 Milwaukee ave., Chicago, Ill.
- Hartwig, Otto J.,  
1570 Milwaukee ave., Chicago, Ill.
- Harvey, John M.,  
407 Delaware ave., Wilmington, Del.
- Hassebrock, Henry F.,  
1901 Wright st., St. Louis, Mo.

- Hassinger, Samuel E. R.,  
Fairmount ave. & 23d st., Philadelphia, Pa.
- Hattenhauer, Robert C.,  
La Salle, Ill.
- Hatton, Edgar M.,  
56 S. Fourth st., Columbus, O.
- Hatton, Ellmore W.,  
90 N. High st., Columbus, O.
- Hauenstein, William,  
375 Amsterdam ave., New York, N. Y.
- Haussamen, Henry L.,  
Grafton, N. Dak.
- Haussmann, Frederick W.,  
907 Hutchinson st., Philadelphia, Pa.
- Haviland, Henry,*  
488 Nostrand ave., Brooklyn, N. Y.
- Hawkins, M. Smith,  
84 Main st., Salem, Columbiana co., O.
- Hawley, Wm. B.,  
308 Main st., Faribault, Minn.
- Hay, Edward A.,  
Middle & Free sts., Portland, Me.
- Hayes, Horace P.,  
312 Elk st., Buffalo, N. Y.
- Hayes, James H.,  
305 Sumner st., E. Boston, Mass.
- Haynes, David O.,  
106 Fulton st., New York, N. Y.
- Hays, Joseph A.,  
147 S. 18th st., Pittsburgh, Pa.
- Hechler, George L.,  
1099 Broadway, Cleveland, O.
- Heddens, Claus H.,  
816 W. Congress st., Chicago, Ill.
- Hedley, Thomas A.,  
137 Pearl st., Boston, Mass.
- Heebner, Charles F.,  
Ontario Coll. Pharm., Toronto, Can.
- Heinemann, Otto,  
Laurel & Linn sts., Cincinnati, O.
- HEINITSH, CHARLES A.,  
16 East King st., Lancaster, Pa.
- Heinitsh, Sigmund W.,  
120 S. Prince st., Lancaster, Pa.
- Heintzelman, Joseph A.,*  
Ridge & College aves., Philadelphia, Pa.
- Helfman, Joseph,  
82 E. Montcalm st., Detroit, Mich.
- Helke, William L.,  
2d & K sts., Sacramento, Cal.
- Heller, Chas. T.,  
33 W. 10th st., St. Paul, Minn.
- Hemm, Francis,  
3907 S. Broadway, St. Louis, Mo.
- Hemm, Louis P.,  
Webster & Jefferson aves., Kirkwood, Mo.
- Henderson, Archibald K.,  
300 Frankstown ave., Pittsburgh, Pa.
- Henry, Charles (Dworniczak),  
Croton-on-Hudson, N. Y.
- Henry, Charles L.,  
443 East Spring st., New Albany, Ind.
- Henry, Frank C.,  
703 15th st. N. W., Washington, D. C.
- Hepburn, John,  
103 Main st., Flushing, N. Y.
- Herbst, Frederick W.,  
446 S. High st., Columbus, O.
- Herbst, William P.,  
2500 Penna. ave. N. W., Washington, D. C.
- Hereth, Frank S.,  
314 Belden ave., Chicago, Ill.
- Hermann, John G.,  
Baltimore & Mechanic sts., Cumberland, Md.
- Hervey, James,  
704 Main st., Dubuque, Ia.
- Heschong, John F.,  
1016 N. Adams st., Peoria, Ill.
- Heseltine, Daniel W.,  
387 Congress st., Portland, Me.
- Hess, Paul L.,  
Independence & Forest aves., Kansas C'y, Mo.
- Hettinger, Howard H.,  
216 E. Douglas ave., Wichita, Kans.
- Heydenreich, Emile,  
30 N. William st., New York, N. Y.
- Heyerdahl, Carl Otto,  
Lake Park, Becker co., Minn.
- Heyl, James B.,*  
Vice-Consul, Hamilton, Bermuda.
- Hickerson, William H.,  
Warren, Ind.
- Higby, William H.,  
215 Main st., Streator, Ill.
- Higgins, Albert W.,  
19 Merchants' Row, Rutland, Vt.
- Hilby, Francis M.,  
Monterey Pharmacy, Monterey, Cal.
- Hildreth, Newton G.,  
Cheviot, O.
- Hill, Frederick J.,  
80 W. 2d South st., Salt Lake City, Utah.
- Hille, David J.,  
Front st., Castle Rock, Wash.

- Hillebert, George A.,  
Wynnewood, Ind. Terr'y.
- Hilton, Samuel L.,  
1033 22d st., N. W., Washington, D. C.
- Hinrichs, Gustavus D.,  
3132 Lafayette ave., St. Louis, Mo.
- Hiriart, Sebastian,  
Bank & Plaquemine sts., Plaquemine, La.
- Hitchcock, John E.,  
Custom House Sq., Plattsburgh, N. Y.
- Hobbs, William,  
Main st., Athol, Mass.
- Hoch, Aquila,  
541 E. Thompson st., Philadelphia, Pa.
- Hodgkinson, Sam'l J.,  
Virginia st., Reno, Nev.
- Hoffman, Julius,  
1063 Central ave., Cincinnati, O.
- Hoffmann, Frederick,  
Ferd. Rhode Str. 21 I., Leipzig, Germany.
- Hogan, John J.,  
90 Meadow st., New Haven, Conn.
- Hogan, Louis C.,  
6216 Wentworth av., Station O, Chicago, Ill.
- Hogey, Julius H.,  
3038 Cottage Grove ave., Chicago, Ill.
- Holgate, Francis H.,  
43 King st., W., Toronto, Can.
- Holland, George,  
603 Gray's Ferry Road, Philadelphia, Pa.
- Holland, Samuel S.,  
Smithfield & Liberty sts., Pittsburgh, Pa.
- Holmes, Clay W.,  
410 W. Gray st., Elmira, N. Y.
- Holmes, Henry E.,  
Seattle, Wash.
- Holverson, Henry T.,  
Alexandria, Minn.
- HOLZHAUER, CHARLES,  
787 Broad st., Newark, N. J.
- Hood, Charles I.,  
Merrimac & Central sts., Lowell, Mass.
- Hopp, Lewis C.,  
198 Euclid ave., Cleveland, O.
- Horn, Wilbur F.,  
32 West Main st., Carlisle, Pa.
- Houghton, Harry J.,  
Wentworth ave. & 66th st., Englewood, Ill.
- Hover, William A.,  
1437 Lawrence st., Denver, Colo.
- Howard, Fletcher,  
Sheldon, Ia.
- Howey, John J.,  
88 Fort st., Montreal, Can.
- Howson, Arthur B.,  
Paint & Main sts., Chillicothe, O.
- Hoyt, George M.,  
East Weymouth, Mass.
- Hubert, Ernest,  
2164 Esplanade ave., New Orleans, La.
- Huder, Henry J.,  
52 East Washington st., Indianapolis, Ind.
- Hudnut, Alexander,  
218 Broadway, New York, N. Y.
- Hudson, Arthur,  
Centre st., Newton, Mass.
- Hudson, T. F.,  
Tempe, Maricopa co., Ariz.
- Huecker, John,  
1317 14th ave., W., Denver, Colo.
- Husted, Alfred B.,  
77 Eagle st., Albany, N. Y.
- Huhn, George,  
123 Nicollet st., Minneapolis, Minn.
- Humiston, Edwin Ray, Jr.,  
Worthington, Minn.
- Hunter, Buxton W.,  
Fayetteville st., Raleigh, N. C.
- Hunter, Henry B.,  
145 N. 10th st., Philadelphia, Pa.
- Huntington, William H.,  
U. S. Naval Sta., Newport, R. I.
- Hurd, John C.,  
26 Market st., Somersworth, N. H.
- Hurlebaus, George W.,  
2030 14th st., N. W., Washington, D. C.
- Hurty, John N.,  
104 N. Penn st., Indianapolis, Ind.
- Huston, Charles,  
47 S. High st., Columbus, O.
- Hutton, Harry D.,  
1033 22d st., N. W., Washington, D. C.
- Hydren, Carl,  
223 North st., Pittsfield, Mass.
- Hyler, William H.,  
Port Chester, N. Y.
- Hynson, Henry P.,  
423 N. Charles st., Baltimore, Md.
- Ingalls, Albert O.,  
Murray, Shoshone co., Idaho.
- Ingalls, John,  
4th & Poplar sts., Macon, Ga.

- Ink, Charles E.,  
Columbiana, O.  
Irvin, William A.,  
El Paso, Texas.  
Jacobs, Joseph,  
53 Marietta st., Atlanta, Ga.  
Jacks, John T.,  
Covington, Tipton co., Tenn.  
JACQUES, GEORGE W.,  
Broadway & Augusta st., S. Amboy, N. J.  
James, William T.,  
20 Main st., Flushing, N. Y.  
Jamieson, Thomas N.,  
3900 Cottage Grove ave., Chicago, Ill.  
Jelliffe, Smith E.,  
231 W. 71st st., New York, N. Y.  
*Jenks, William J.,*  
4043 Market st., Philadelphia, Pa.  
Jesson, Jacob,  
Western ave. & Jefferson st., Muskegon, Mich.  
Jewell, Walter H.,  
98 William st., New York, N. Y.  
Joergensen, Sophus,  
Commercial st., La Conner, Skagit co., Wash.  
Johnson, Charles B.,  
54 Third st., Middletown, O.  
Johnson, Daniel D.,  
Concord, N. C.  
Johnston, Henry A.,  
1221 New Jersey ave. N.W., Washington, D.C.  
Jones, Alexander H.,  
9th & Parrish sts., Philadelphia, Pa.  
Jones, David F.,  
Watertown, S. Dak.  
Jones, Edward B.,  
Mount Holly, N. J.  
Jones, James H.,  
3d ave. & 189th st., New York, N. Y.  
Jones, James T.,  
855 E. 4th st., South Boston, Mass.  
Jones, Simon N.,  
1st & Jefferson sts., Louisville, Ky.  
Joy, Edwin W.,  
Market & Powell sts., San Francisco, Cal.  
Joyce, Robert,  
67 Bank st., Newark, N. J.  
Judisch, George,  
W. 5th & Walnut sts., Des Moines, Ia.  
Jungkind, John A.,  
806 Main st., Little Rock, Ark.  
Jungmann, Julius,  
1047 3d ave., New York, N. Y.  
Kaczoroski, Adolph O.,  
1811 London ave., New Orleans, La.  
Kaiser, William O.,  
903 6th ave., Des Moines, Ia.  
Kalish, Julius,  
413 Grand st., New York, N. Y.  
Karb, George J.,  
4th & Main sts., Columbus, O.  
Kauffman, George B.,  
235 N. High st., Columbus, O.  
Kebler, Lyman F.,  
305 Cherry st., Philadelphia, Pa.  
Keefer, Charles D.,  
Main & Queen sts., Chambersburg, Pa.  
Keenan, Thomas J.,  
66 W. Broadway, New York, N. Y.  
Keene, Thomas R.,  
256 Elm st., Dallas, Tex.  
Keeney, Caleb R.,  
16th & Arch sts., Philadelphia, Pa.  
Keith, Irwin A.,  
Lake Preston, Kingsbury Co., S. Dak.  
Kellam, Chas. R. J.,  
Heron Lake, Minn.  
Kelley, Edward S.,  
392 Boylston st., Boston, Mass.  
Kelley, Gilliam Jeter,  
20 Williams st., Atlanta, Ga.  
Kelly, George A.,  
101 Wood st., Pittsburg, Pa.  
Kemp, Edward,  
68 William st., New York, N. Y.  
Kennedy, Ezra J.,  
106 Fulton st., New York, N. Y.  
Kennedy, George W.,  
103 N. Centre st., Pottsville, Pa.  
Kenney, Herbert E.,  
Littleton, N. H.  
Kent, Henry A., Jr.,  
Park Drug Store, Elizabeth, N. J.  
*Kent, Robert R.,*  
Apopka, Orange Co., Fla.  
Kenworthy, John,  
Coatesville, Chester Co., Pa.  
Keppler, Charles L.,  
461 Dryades st., New Orleans, La.  
Keppler, Christian L.,  
461 Dryades st., New Orleans, La.  
Kerr, Frank G.,  
Van Buren, Ark.  
Kerr, William W.,  
Russellville, Ark.



- Kershaw, John P.,  
     St. Joseph, Tensas Parish, La.  
 Kettler, Edward, Jr.,  
     Farwell ave. & Brady st., Milwaukee, Wis.  
 Kiedaisch, John F., Jr.,  
     1028 Main st., Keokuk, Ia.  
 Kieffer, George,  
     620 Lorain st., Cleveland, O.  
 Kienth, Hans,  
     6c8 Mitchell st., Milwaukee, Wis.  
 Kilbourne, Lewis P.,  
     Bayou Sara, La.  
 Kilmer, Frederick B.,  
     17 Codnise ave., New Brunswick, N. J.  
 King, George A. N.,  
     100 Washington ave., Minneapolis, Minn.  
 KING, JAMES T.,  
     Main & South sts., Middletown, N. Y.  
 King, Robert B.,  
     Helena, Ark.  
 Kirchgasser, William C.,  
     5347 S. Halstead st., Chicago, Ill.  
 Kirchhofer, Paul,  
     Massillon, Stark Co., O.  
 Kirk, James E.,  
     101 Main st., Jacksonville, Fla.  
 Kirkland, Derwentwater,  
     320 S. Spring st., Los Angeles, Cal.  
 Klauber, Charles N.,  
     566½ Elm st., Dallas, Tex.  
 Klayer, Louis,  
     9th & Elm sts., Cincinnati, O.  
 Klein, Ernest F.,  
     218 Central ave., Hot Springs, Ark.  
 Klein, Frederick,  
     323 W. Madison st., Chicago, Ill.  
 Klie, G. H. Charles,  
     5100 N. Broadway, St. Louis, Mo.  
 Kline, Charles G.,  
     430 Roane st., Harriman, Tenn.  
 Kline, Charles S.,  
     19th & Welton sts., Denver, Colo.  
 Kline, Mahlon N.,  
     427 Arch st., Philadelphia, Pa.  
 Klotz, August E.,  
     471 N. Ashland ave., Chicago, Ill.  
 KLUSSMANN, HERMANN,  
     4th st. & Lafayette ave., Hoboken, N. J.  
 Knabe, Gustavus A.,  
     Court Square & Dexter av., Montgomery, Ala.  
 Knoebel, Thomas,  
     209 Collinsville ave., East St. Louis, Ill.  
 Knoefel, Bruno,  
     394 E. Spring st., New Albany, Ind.  
 Knoefel, Charles D.,  
     7 E. Market st., New Albany, Ind.  
 Knudsen, Rudolph H.,  
     285 Noble st., Chicago, Ill.  
 Koch, John A.,  
     Garfield Mem. Hosp., Washington, D. C.  
 Koch, Julius A.,  
     12th & Carson sts., Pittsburgh, Pa.  
 Koch, Louis,  
     329 N. 4th St., Philadelphia, Pa.  
 Kochan, John,  
     1463 Larimer st., Denver, Colo.  
 Koehnken, Herman H.,  
     4th & Mill sts, Cincinnati, O.  
 Koles, Samuel M.,  
     945 First ave., New York, N. Y.  
 Kraemer, Henry,  
     2421 Dearborn st., Chicago, Ill.  
 Krehe, J. Theodor,  
     314 E. 2d st., Muscatine, Iowa.  
 Kremers, Edward,  
     435 Park st., Madison, Wis.  
 Krewson, William E.,  
     1836 Franklin st., Philadelphia, Pa.  
 Krieger, Philip,  
     Tompkins ave., cor. Myrtle, Brooklyn, N. Y.  
 Kuder, William F.,  
     342 Jennings ave., Cleveland, O.  
 Kuhn, Norman A.,  
     124 S. 15th st., Omaha, Neb.  
 Kurfurst, Henry F.,  
     502 Xenia ave., Dayton, O.  
 La Pierre, Elie H.,  
     96 River st., Cambridgeport, Mass.  
 La Rue, William I.,  
     Athens, Texas.  
 Lachance, Seraphin,  
     1538 St. Catharine st., Montreal, Can.  
 Lahme, Charles A.,  
     428 Main st., Kansas City, Mo.  
 Laing, Alfred A.,  
     273 Pearl st., Cambridgeport, Mass.  
 Laird, John,  
     Diamond P. O., Ark.  
 Lampa, Robert R.,  
     50 Clinton ave., West Hoboken, N. J.  
 Lantot, Henri,  
     299½ St. Lawrence st., Montreal, Can.  
 LAND, ROBERT H.,  
     812 Broad st., Augusta, Ga.

- Lander, John C.,  
Yorkville, Toronto, Can.
- Lane, Edward B.,  
1238 Euclid ave., Cleveland, O.
- Lariviere, Telesphore,  
1101 Adams st., N. E., Minneapolis, Minn.
- Lauricella, Felice,  
175 North st., Boston, Mass.
- Lavigne, Jean B.,  
261 N. Poydras st., New Orleans, La.
- LaWall, Charles H.,  
305 Cherry st., Philadelphia, Pa.
- Lawbaugh, Emanuel S.,  
2d & Walnut sts., St. Mary's, Mo.
- Layton, Thomas,  
2743 N. Grand ave., St. Louis, Mo.
- Leavitt, Miner L. H.,  
91 Portland st., Boston, Mass.
- Lecours, Joseph E. W.,  
370 Craig st., Montreal, Can.
- Lee, Charles H.,  
Main st., New Iberia, La.
- Lee, Charles J.,  
Main st., Valley City, N. Dak.
- LEE, JAMES A.,  
Main st., New Iberia, La.
- Leenheer, Bastian,  
871 W. 22d st., Chicago, Ill.
- Legendre, Joseph A.,  
25 Dauphin st., New Orleans, La.
- Lehman, Louis,  
1231 N. Halstead st., Chicago, Ill.
- Lehn, Louis,  
45 Strong Place, Brooklyn, N. Y.
- Lehnkering, Charles F.,  
744 Eastern ave., Cincinnati, O.
- Lehr, Philip,  
1145 Lorain st., Cleveland, O.
- Leine, Arthur M.,  
P. O. Box 611, Honesdale, Pa.
- Leis, George,  
747 Massachusetts st., Lawrence, Kan.
- Leist, Jacob L.,  
Cor. Illinois & First sts., Indianapolis, Ind.
- Leitch, Arthur,  
Residence Unknown.
- LEMBERGER, JOSEPH L.,  
5 N. 9th st., Lebanon, Pa.
- Leonardi, Sydney B.,  
Franklin st., Tampa, Fla.
- Leonhard, Rudolph E.,  
P. O. Box 46, Paterson, N. J.
- Lernhart, August,  
P. O. Box 10, Centreville, Alameda co., Cal.
- Levinson, Joseph,  
11 Main st., Napa, Cal.
- Levy, Adolph,  
145 Grand st., E. D., Brooklyn, N. Y.
- Levy, William M.,  
1382 Magazine st., New Orleans, La.
- Lewi, Theodore J.,  
Hudson ave. & Eagle st., Albany, N. Y.
- Lewis, Ernest G.,  
701 Centre st., Jamaica Plain, Mass.
- Libby, Henry F.,  
Main st., Pittsfield, Me.
- Lilly, Eli,  
Care of Eli Lilly & Co., Indianapolis, Ind.
- Lilly, Josiah K.,  
Indianapolis, Ind.
- Lillybeck, Oscar,  
5th st. & 23d ave., Meridian, Miss.
- Linton, Charles E.,  
Mill st., Woods, Tillamook co., Ore.
- Lisle, Justin D.,  
Yellow Springs & High sts., Springfield, O.
- Livingston, Barent V. B.,  
306 Broadway, Brooklyn, N. Y.
- LLEWELLYN, JOHN F.,  
Public Square, Mexico, Audrian co., Mo.
- Lloyd, John U.,  
Court & Plum sts., Cincinnati, O.
- Lockert, Charles L.,  
96 Franklin st., Clarksville, Tenn.
- Lockie, James A.,  
1128 Main st., Buffalo, N. Y.
- Loehr, Theodore C.,  
Carlinville, Macoupin co., Ill.
- Lohmann, Herman J.,  
90 Monticello ave., Jersey City, N. J.
- Loomis, John C.,  
Chestnut & Watt sts., Jeffersonville, Ind.
- Lord, Frank J.,  
1101 Larimer st., Denver, Colo.
- Lord, Thomas,  
72 Wabash ave., Chicago, Ill.
- Lovis, Henry C.,  
2137 7th ave., New York, N. Y.
- Lowd, John C.,  
43 Temple Place, Boston, Mass.
- Lowden, John,  
53 Colborne st., Toronto, Can.
- Lowe, Clement B.,  
1125 Mt. Vernon st., Philadelphia, Pa.

- Lowell, Edward M.,  
19 Hammond st., Lewiston, Me.
- Lueder, Fritz,  
511 S. Adams st., Peoria, Ill.
- Lundberg, John C.,  
cor Halstead & Harrison sts., Chicago, Ill.
- Lyons, Albert B.,  
Honolulu, Sandwich Islands.
- Lyons, Fred. W.,  
464 Bergen ave., Jersey City, N. J.
- Lyons, Isaac L.,  
42 Camp st., New Orleans, La.
- MacDonald, Allan D.,  
233 $\frac{1}{2}$  Duffy st., Savannah, Ga.
- Macdonald, Daniel T.,  
Red Jacket, Houghton co., Mich.
- Macmillan, Alexander M.,  
25 Phillips Sq., Montreal, Can.
- MacRae, John Y.,  
Martin & Market sts, Raleigh, N. C.
- Macy, Sherman R.,  
Highland Park Normal Coll., Des Moines, Ia.
- Maguire, Andrew,  
249 Blue Island ave., Chicago, Ill.
- Main, Thomas F.,  
278 Greenwich st., New York, N. Y.
- Maine, August,  
352 Whitesboro st, Utica, N. Y.
- Maisch, Henry C. C.,  
10th & Ogden sts., Philadelphia, Pa.
- Majer, Oscar,  
400. S. 2d st., Clinton, Ia.
- Major, John R.,  
800 7th st., Washington, D. C.
- Mallinckrodt, Edward,  
Mallinckrodt & Main sts., St. Louis, Mo.
- Mann, Albert,  
39 S. Main st., Ann Arbor, Mich.
- Manning, John H.,  
51 North st., Pittsfield, Mass.
- Marelius, Charles R.,  
640 Bedford st., St. Paul, Minn.
- Marshall, Ernest C.,  
157 Bunker Hill st., Charlestown, Mass.
- Marshall, Rush P.,  
16th & Race sts., Philadelphia, Pa.
- Marsteller, George L.,  
231 King st., Charleston, S. C.
- Martin, John C.,  
U. S. Nav. Dispensary, Washington, D. C.
- Martin, Nicholas H.,  
8 Windsor Crescent, Newcastle-on-Tyne, Eng.
- Mason, George L.,  
Walla Walla, Wash.
- Mason, Harry B.,  
Dannemora, N. Y.
- Mason, Harry Ruggles,  
402 Centre st., Newton, Mass.
- Massey, William M.,  
1129 Broadway, New York, N. Y.
- Matthews, Charles E.,  
221 Randolph st., Chicago, Ill.
- May, Arthur F.,  
227 Garden st., Cleveland, O.
- May, Eugene,  
Canal & Chartres sts., New Orleans, La.
- May, James O.,  
Water st., Naugatuck, Conn.
- Mayo, Caswell A.,  
66 West Broadway, New York, N. Y.
- McAfee, John J.,  
252 Beauregard st., Mobile, Ala.
- McClern, Henry T.,  
115 North st., Portland, Me.
- McColgan, Adam T.,  
507 Tremont st., Boston, Mass.
- McConville, Thomas A.,  
Residence Unknown.
- McCrea, Harry F.,  
17th & Champa sts., Denver, Colo.
- McDonald, George,  
Main & Burdick sts., Kalamazoo, Mich.
- McElhenie, Thomas D.,  
259 Ryerson st., Brooklyn, N. Y.
- McElwee, Emer J.,  
517 Main st., Mount Pleasant, Pa.
- McFarland, Andrew,  
693 Michigan ave., Detroit, Mich.
- McFarland, Robert M.,  
2d & Elm sts., Henderson, Ky.
- McGeorge, William,  
Metropolitan ave. & 2d st., Argentine, Kan.
- McGill, John T.,  
Vanderbilt University, Nashville, Tenn.
- McIntyre, Byron F.,  
121 Munn ave., East Orange, N. J.
- McIntyre, Ewen,  
303 W. 74th st., New York, N. Y.
- McIntyre, William,  
2429 Frankford ave., Philadelphia, Pa.
- McKesson, G. Clinton,  
91 Fulton st., New York, N. Y.
- McKesson, John, Jr.,  
91 Fulton st., New York, N. Y.

- McLean, George,  
Orrick, Ray co., Mo.
- McMeel, James H.,  
Lost Nation, Ia.
- McPherson, George,  
Residence Unknown.
- Means, John C.,  
123 N. Commerce st., Natchez, Miss.
- Mebane, Robert S.,  
336 Ashe st., Greensboro, N. C.
- Mehl, Henry W.,  
5th & Delaware sts., Leavenworth, Kan.
- Meininger, Albert,  
Hamilton & Chase aves., Cincinnati, O.
- Meissner, F. W., Jr.,  
820 Main st., La Porte, Ind.
- Mellor, Alfred,  
218 N. 22d st., Philadelphia, Pa.
- Melvin, Samuel H.,  
6th ave. & 14th st., East Oakland, Cal.
- Mennen, Gerhard,  
577 Broad st., Newark, N. J.
- Merrell, Ashbel H.,  
1021 6th ave. W., Topeka, Kan.
- Merrell, Charles G.,  
6th st. & Eggleston ave., Cincinnati, O.
- Merrell, George,  
6th st. & Eggleston ave., Cincinnati, O.
- Metz, Abraham L.,  
Prytania st., New Orleans, La.
- MEYER, CHRISTIAN F. G.,  
4th st. and Clark ave., St. Louis, Mo.
- Meyer, William V.,  
338 Superior st., Cleveland, O.
- Michaelis, Gustavus,  
1 Myrtle ave., Albany, N. Y.
- Miles, Henry,  
53 St. Sulpice st., Montreal, Can.
- MILHAU, EDWARD L.,  
183 Broadway, New York, N. Y.
- MILLER, ADOLPH W.,  
3d & Callowhill sts., Philadelphia, Pa.
- Miller, Emerson R.,  
Polytechnic Inst., Auburn, Ala.
- Miller, Jacob A.,  
2d & Chestnut sts., Harrisburg, Pa.
- Miller, James M.,  
Main st., Vacaville, Solano co., Cal.
- Miller, Jason A.,  
7 N. Main st., Gloversville, N. Y.
- Miller, Polk,  
900 Main st., Richmond, Va.
- Miller, Turner Ashby,  
431 E. Broad st., Richmond, Va.
- Milligan, Decatur,  
509 N. 2d st., Philadelphia, Pa.
- Miner, Maurice A.,  
2421 Dearborn st., Chicago, Ill.
- Miner, Mrs. Mary O.,  
Hiawatha, Brown co., Kan.
- Miner, Orrin E.,  
3 Front st., Noank, Conn.
- Mittelbach, William,  
114 Main st., Boonville, Mo.
- Miville, Francis C.,  
1024 Elm st., Manchester, N. H.
- Mix, Willis L.,  
871 Chapel st., New Haven, Conn.
- Moffett, Thomas J.,  
Edinburgh, Ind.
- Moffit, Thomas S.,  
2119 Webster st., San Francisco, Cal.
- Mohr, Charles,  
931 Dauphin st., Mobile, Ala.
- Mohr, Chas. A.,  
931 Dauphin st., Mobile, Ala.
- Moith, Augustus T.,  
1 Ferry st., Fishkill, N. Y.
- Molwitz, Ernest,  
2707 8th ave., New York, N. Y.
- Moody, Richard H.,  
Main & High sts., Belfast, Me.
- Moore, Charles G.,  
Eufaula, Indian Territory.
- MOORE, GEORGE,  
26 Market st., Somersworth, N. H.
- MOORE, JOACHIM B.,  
13th & Lombard sts., Philadelphia, Pa.
- Moore, John T.,  
1012 Rhode Island st., Lawrence, Kan.
- Moore, Josh. F.,  
4th st., Meridian, Miss.
- Moore, Silas H.,  
525 4th st., Sioux City, Ia.
- Moore, Thos. F.,  
Cor. Dauphin & Conception sts., Mobile, Ala.
- Morgan, Aylmer L.,  
Washington & Adam sts., Camden, Ark.
- Morgan, Eugene H.,  
Granbury, Hood co., Tex.
- Morison, J. Louis D.,  
145 N. 10th st., Philadelphia, Pa.
- Mork, Thomas K.,  
Wheaton, Minn.

- Morland, Robert L.,  
     132 State st., Chicago, Ill.  
 Morley, William J.,  
     214 S. Main st., St. Louis, Mo.  
 Morris, Lemuel I.,  
     72c N. Broad st., Philadelphia, Pa.  
 Morrison, Joseph E.,  
     43 Church st., Montreal, Can.  
 Morse, C. Milan,  
     92 Main st., Nashua, N. H.  
 Morse, Edward W.,  
     Townly Park, Mt. Vernon, Ill.  
 Morton, John W.,  
     521 Garrison ave., Fort Smith, Ark.  
 Mosher, William W.,  
     13 Colony st., Meriden, Conn.  
 Moulton, Daniel P.,  
     213 Lisbon st., Lewiston, Me.  
 Mowry, Albert D.,  
     329 Warren st., Boston, Mass.  
 Mueller, Adolph,  
     Cherry st., Highland, Ill.  
 Mueller, Ambrose,  
     Old Orchard, St. Louis, Mo.  
 Mueller, Otto E.,  
     801 E. Madison st., Louisville, Ky.  
 Muir, Ebenezer,  
     595 Lagauchetiere st., Montreal, Can.  
 Mulcahy, Daniel D.,  
     831 N. Capitol st., Washington, D. C.  
 Mulford, Henry K.,  
     412 S. 13th st., Philadelphia, Pa.  
 Murphy, John J.,  
     Pittsfield, Mass.  
 Murphy, John S.,  
     Union Block, Pontiac, Ill.  
 Murray, Benj. L.,  
     care Merck & Co., New York, N. Y.  
 Murray, Emmett L.,  
     Americus, Ga.  
 Muth, George L.,  
     15 E. Fayette st., Baltimore, Md.  
 Myers, Daniel,  
     111 Water st., Cleveland, O.  
 Myers, George W.,  
     Lakeport, Cal.  
 Naly, Sarah L.,  
     1532 Court Place, Denver, Colo.  
 Nattans, Arthur,  
     2d & D sts. N. W., Washington, D. C.  
 Neathery, James N.,  
     North side Jefferson st., Van Alstyne, Tex.  
 Neppach, Stephen A.,  
     Fruit Vale, Alameda co., Cal.  
 Newbold, Thomas M.,  
     608 S. 42d st., Philadelphia, Pa.  
 Newman, George A.,  
     5th & Walnut sts., Louisville, Ky.  
*Newman, George A.,*  
     380 Myrtle ave., Brooklyn, N. Y.  
 Newton, Philo W.,  
     142 Asylum st., Hartford, Conn.  
 Nichols, John C.,  
     55 State st., New London, Conn.  
 Nichols, Thomas B.,  
     178 Essex st., Salem, Mass.  
 Nickey, Frank B.,  
     125 E. Main st., Muncie, Ind.  
 Nipgen, John A.,  
     Paint & 2d sts., Chillicothe, O.  
 Nisbet, William W.,  
     Washington ave., Pittsburgh, Pa.  
 Noble, William W.,  
     Berea, Cuyahoga co., O.  
 Noll, Matthias,  
     627 Commercial st., Atchison, Kan.  
 Nordmann, Herman,  
     1231 E. Preston st., Baltimore, Md.  
 Norton, George E.,  
     223 Putnam ave., Cambridgeport, Mass.  
 Nowers, Lawrence E.,  
     Hillsborough, Sierra co., N. Mex.  
 O'Hare, James,  
     6 Benefit st., Providence, R. I.  
 O'Neil, Henry M.,  
     463 Hudson st., New York, N. Y.  
 Oberdeener, Samuel,  
     Franklin st., Santa Clara, Cal.  
 Odell, Willis B.,  
     Residence Unknown.  
 Offutt, Willard C.,  
     146 Liberty st., Savannah, Ga.  
 Ogden, John,  
     1233 Walnut st., Philadelphia, Pa.  
 Ogier, John M.,  
     816 Wheeling ave., Cambridge, O.  
 Oglesby, George D.,  
     Lake ave. & 50th st., Chicago, Ill.  
 Ohliger, Lewis P.,  
     23 West Liberty st., Wooster, O.  
 Oldberg, Oscar,  
     2421 Dearborn st., Chicago, Ill.  
 Oleson, Olaf M.,  
     Fort Dodge, Ia.

- Oliver, William M.,  
132 Broad st., Elizabeth, N. J.
- Oliff, James H.*,  
200 Arlington ave., Plainfield, N. J.
- ORNE, JOEL S.,  
493 Main st., Cambridgeport, Mass.
- Ortmann, John H.,  
450 Dauphin st., Mobile, Ala.
- Orton, Ingomar F.,  
13th st., Galveston, Tex.
- Osgood, Hugh H.,  
148 Main st., Norwich, Conn.
- Osmun, Charles A.,  
13 7th ave., New York, N. Y.
- Otis, Clark Z.,  
63 Court st., Binghamton, N. Y.
- Ottinger, James J.,  
20th & Spruce sts., Philadelphia, Pa.
- Otto, John N. W.,  
76 S. Rampart st., New Orleans, La.
- Overstreet, William P.,  
1624 15th st., Louisville, Ky.
- Owens, James A.,  
45 Dominick st., Rome, N. Y.
- OWENS, RICHARD J.,  
Myrtle ave. & Spencer st., Brooklyn, N. Y.
- Page, David S.,  
1423 Church st., Nashville, Tenn.
- Paine, James D.*,  
P. O. Box 64, Rochester, N. Y.
- Parcher, George A.,  
14 Main st., Ellsworth, Me.
- Parisen, Allen C.,  
Broadway & David st., South Amboy, N. J.
- Parisen, George W.,  
Smith & High sts., Perth Amboy, N. J.
- Parker, Arthur S.,  
747 Woodward ave., Detroit, Mich.
- Parker, George H.,  
Draper's Block, Main st., Andover, Mass.
- Parker, Walter W.,  
Main st., Henderson, N. C.
- Parker, William S.,  
Lisbon, N. Dak.
- Parkill, Stanley E.,  
Owosso, Shiawassee co., Mich.
- Parks, John K.,  
Box 96, Woodfords, Me.
- Parr, John C.*,  
1432 S. Main st., Los Angeles, Cal.
- Parrott, John E.,  
Littleton, Halifax co., N. C.
- Parsons, John,  
194 31st st., Chicago, Ill.
- Partridge, Charles K.,  
Granite Block, Augusta, Me.
- Partridge, Frank R.,  
Water st., Augusta, Me.
- Patch, Edgar L.,  
P. O. Box 639, Stoneham, Mass.
- Patten, I. Bartlett*,  
594 Washington st., Boston, Mass.
- Patterson, Theodore H.,  
3640 Cottage Grove ave., Chicago, Ill.
- Pattison, George H.,  
1467 State st., Chicago, Ill.
- Patton, John F.,  
237 W. Market st., York, Pa.
- Pauley, Frank C.,  
Eastern st. & Compton ave., St. Louis, Mo.
- Payne, George F.,  
State Capitol, Atlanta, Ga.
- Peabody, William H.*,  
8 S. Division st., Buffalo, N. Y.
- Peacock, Josiah C.,  
3909 N. 5th st., Philadelphia, Pa.
- Pearce, Howard A.,  
370 Elmwood ave., Providence, R. I.
- Pease, Autumn V.,  
Fairbury, Neb.
- Pease, Francis M.,  
Main st., Lee, Mass.
- Peck, George L.,  
Hall of Pharmacy, Jamaica, N. Y.
- Pennington, T. H. Sands,  
14 2d st., Troy, N. Y.
- Percy, William G.,  
Brainerd, Minn.
- Perham, Henry A.,  
Main st., Lexington, Mass.
- Perkins, Benjamin A.,  
16 Pine st., Portland, Me.
- Perkins, C. William,  
215 Main st., New Britain, Conn.
- Perkins, William A.,  
84 S. C st., Virginia City, Nev.
- Perot, T. Morris*,  
1810 Pine st., Philadelphia, Pa.
- Perry, Frederick W. R.,  
709 Woodward ave., Detroit, Mich.
- Peter, Minor C.,  
832 Sixth st., Louisville, Ky.
- Peters, John M.,  
84 William st., New York, N. Y.

- Peterson, J. Otto,  
1501 Washington ave.S., Minneapolis, Minn.
- Petsche, Bismarck W.,  
Arlington Chemical Co., Yonkers, N. Y.
- PETTIT, HENRY M.,  
15 S. Main st., Carrollton, Mo.
- Peyton, Robert D.,  
1317 4th ave., Louisville, Ky.
- Pfafflin, Henry A.,  
402 S. Delaware st., Indianapolis, Ind.
- Pfeiffer, John,  
241 Nostrand ave., Brooklyn, N. Y.
- Pfiffner, Fritz J. R.,  
38 N. Sandusky st., Delaware, O.
- PFINGST, FERDINAND J.,  
18th & Main sts., Louisville, Ky.
- Pfunder, William,  
3d & Oak sts., Portland, Oregon.
- Phillimore, Fred. G.,  
331 Hanover st., Boston, Mass.
- Phillips, Carrie Elizabeth,  
17 Wyeth st., Cambridge, Mass.
- Phillips, Charles W.,  
484 Eastern ave., Cincinnati, O.
- Phillips, Edwin F.,  
4 E. Main st., Armada, Mich.
- Pickett, John H.,  
Oskaloosa, Mahaska co., Ia.
- Pieck, Edward L.,  
6th & Main sts., Covington, Ky.
- Pierce, William H.,  
316 Shawmut ave., Boston, Mass.
- Pile, Gustavus,  
770 Passyunk ave., Philadelphia, Pa.
- Pinniger, William,  
2 Virginia st., Reno, Nev.
- Pitt, John R.,  
218 Main st., Middletown, Conn.
- Plaut, Albert,  
128 William st., New York, N. Y.
- Pleasants, Charles H.,  
61 West Houston st., New York, N. Y.
- Plenge, Henry,  
8 Broad st., Charleston, S. C.
- Plummer, David G.,  
6 Main st., Bradford, Stark co., Ill.
- Plummer, Edward,  
405 5th ave., New York, N. Y.
- Porter, Chilton S.,  
Somerset, Pulaski co., Ky.
- Porter, Henry C.,  
Main & Pine sts., Towanda, Pa.
- Porter, Louis F.,  
151 Winsor st., Cambridgeport, Mass.
- Porter, Millett N.,  
3850 State st., Chicago, Ill.
- Porterfield, William C.,  
Silver City, N. Mex.
- Potter, William R.,  
446 Broad st., Providence, R. I.
- Potts, David G.,  
24 S. 2d st., Philadelphia, Pa.
- Powell, William C.,  
Snow Hill, Md.
- Power, Frederick B.,  
8 Snow Hill, London, Eng.
- Prall, Delbert E.,  
111 S. Jefferson ave., Saginaw, Mich.
- Preissler, H. W.,  
Shelbyville, Ky.
- Prentiss, John B.,  
905 E. 8th st., Terre Haute, Ind.
- Prescott, Albert B.,  
University of Michigan, Ann Arbor, Mich.
- Prescott, Horace A.,  
360 Washington st., Boston, Mass.
- Preston, Andrew P.,  
2 Congress Block, Portsmouth, N. H.
- Preston, David,  
9th & Lombard sts., Philadelphia, Pa.
- Price, Charles H.,  
226 Essex st., Salem, Mass.
- Price, Joseph,  
226 Essex st., Salem, Mass.
- Prieson, Adolph,  
100 Main st., Lock Haven, Pa.
- Priest, Carlton R.,  
1 Nassau st., Princeton, N. J.
- Procter, Wallace,  
1900 Pine st., Philadelphia, Pa.
- Puckner, William A.,  
465 State st., Chicago, Ill.
- Punch, William F.,  
71 Dauphin st., Mobile, Ala.
- Purcell, Nicholas S.,  
King st., Leesburgh, Va.
- Pyle, Cyrus,  
66 First Place, Brooklyn, N. Y.
- Quackinbush, Benjamin F.,  
703 Greenwich st., New York, N. Y.
- Quandt, Arthur A.,  
124 S. Howard st., Baltimore, Md.
- Quandt, Ernest E.,  
124 S. Howard st., Baltimore, Md.

- Qvale, Victor A.,  
Rochester, Minn.
- Rademaker, Herman H.,  
801 E. Madison st., Louisville, Ky.
- Rains, A. Brown,  
11 W. 7th st., Columbia, Tenn.
- RAMSPERGER, GUSTAVUS,  
236 E. 23d st., New York, N. Y.
- Rand, Daniel M.,  
Main & Depot sts., S. Windham, Me.
- Randall, Frank O.,  
101 N. Main St., Brockton, Mass.
- Rano, Charles O.,  
1872 Niagara st., Buffalo, N. Y.
- Rapelye, Charles A.,  
325 Main st., Hartford, Conn.
- Rauschkolb, John,  
251 S. 4th st., Columbus, O.
- Ray, Frederick E.,  
901 K st., Sacramento, Cal.
- Ray, Peter W.,  
379 S. 2d st., Brooklyn, N. Y.
- Redsecker, Jacob H.,  
810 Cumberland st., Lebanon, Pa.
- Reed, Thomas D.,  
91 University st., Montreal, Can.
- Reed, Willoughby H.,  
Marshall & Astor sts., Norristown, Pa.
- Reidy, Michael,  
Shiawassee ave., Corunna, Mich.
- REMINGTON, JOSEPH P.,  
1832 Pine st., Philadelphia, Pa.
- Renz, Frederick J.,  
Market & Floyd sts., Louisville, Ky.
- Reynolds, Howard P.,  
71 N. Washington ave., Plainfield, N. J.
- Reynolds, John J.,  
Water & Main Cross sts., Flemingsburg, Ky.
- Reynolds, William K.,  
354 Friendship st., Providence, R. I.
- Rhode, Rudolph E.,  
504 N. Clark st., Chicago, Ill.
- Rhodes, Chas. O.,  
4 Main st., Groton, N. Y.
- Rice, Charles,  
Bellevue Hospital, New York, N. Y.
- Rich, Willis S.,  
166 Union st., Olean, N. Y.
- Richard, Alexander,  
205 S. Main st., Stillwater, Minn.
- Richardson, Frank,  
326 Clinton ave., Albany, N. Y.
- Richardson, Horatio S.,  
Box 403, Main st., Concord, Mass.
- Richardson, Thomas L.,  
Huntington ave. & Oak st., Baltimore, Md.
- Richter, Gustave A.,  
801 S. Front st., Philadelphia, Pa.
- Riddell, Benjamin F.,  
8 Granite Block, Fall River, Mass.
- Ridgway, Lemuel A.,  
Fillmore, Alleghany Co., N. Y.
- Riesenman, Joseph,  
1266 Liberty st., Franklin, Pa.
- Rittenhouse, Henry M.,  
1705 N. 17th st., Philadelphia, Pa.
- Rives, Edward B.,  
56 N. Main st., Los Angeles, Cal.
- Roberts, Daniel J.,  
Peabody, Marion co., Kan.
- Robertson, Felix O.,  
Searcy, White co., Ark.
- Robertson, Peter,  
Main st., Newberry, S. C.
- Robins, Wilbur F.,  
28 Main st., Littleton, N. H.
- Robinson, Edward A.,  
19 Warwick st., Lowell, Mass.
- Robinson, Ernest F.,  
832 Yonge st., Toronto, Can.
- ROBINSON, JAMES S.,  
2d & Madison sts., Memphis, Tenn.
- Robinson, William A.,  
49 Drummond st., Auburn, Me.
- Rockefeller, Lucius,  
Palisade ave., Englewood, N. J.
- Rogers, Arthur H.,  
Geneseo, Livingston co., N. Y.
- Rogers, Henry H.,  
224 Court st., Kankakee, Ill.
- Rogers, Wiley,  
Taylorsville, Ky.
- Rogers, William H.,  
North st., Middletown, N. Y.
- Rohde, Claus F.,  
Spring Valley, Minn.
- Rollins, John F.,  
Fort George, Duval co., Fla.
- ROSENGARTEN, MITCHELL G.,  
17th & Fitzwater sts., Philadelphia, Pa.
- Rosenthal, David A.,  
Gay & Depot sts., Knoxville, Tenn.
- Rosewater, Nathan,  
939 Woodland ave., Cleveland, O.



- Roux, Nemours P.,  
501 N. Rampart st., New Orleans, La.
- Rowlinski, Robert A.,  
104 Broughton st., Savannah, Ga.
- Roy, J. Emile,  
81 St. John st., Quebec, Can.
- Ruddiman, Edsel A.,  
Vanderbilt Univ., Nashville, Tenn.
- Rudolf, Eliza,  
Dryades & 2d sts., New Orleans, La.
- Ruenzel, Henry G.,  
753 3d st., Milwaukee, Wis.
- Ruete, Theodore W.,  
568 Main st., Dubuque, Iowa.
- Runyon, Edward W.,  
497 5th ave., New York, N. Y.
- Ruppert, John,  
Price Hill, Cincinnati, O.
- Rusby, Henry H.,  
222 W. 132d st., New York, N. Y.
- Russell, Eugene J.*,  
Army st. & Canton ave., Baltimore, Md.
- Ryan, Frank G.,  
145 N. 10th st., Philadelphia, Pa.
- Sadtler, Samuel P.,  
204 N. 34th st., Philadelphia, Pa.
- Sample, Ellmer W.,  
31 N. Second st., Ironton, O.
- SANDER, ENNO,  
129 S. 11th st., St. Louis, Mo.
- Sanderson, Stephen F.,  
828 Nicollet ave., Minneapolis, Minn.
- Sargent, Ezekiel H.,  
125 State st., Chicago, Ill.
- Sauer, Louis W.,  
927 Central ave., Cincinnati, O.
- Sauerhering, Rudolph A.,  
Main st., Mayville, Dodge co., Wis.
- SAUNDERS, WILLIAM,  
Central Experim. Farm, Ottawa, Can.
- Sawyer, Charles H.,  
52 Main st., Saco, Me.
- Sawyer, William F.,  
1152 Tremont st., Boston, Mass.
- Sayre, Edward A.,  
Care of Seabury & Johnson, New York, N. Y.
- Sayre, Lucius E.,  
University of Kansas, Lawrence, Kan.
- Sayre, William H.,  
Warner & Orange sts., Newark, N. J.
- Schafer, George H.,  
713 Front st., Fort Madison, Iowa.
- Schafhirt, Adolph J.,  
1st & H sts., Washington, D. C.
- Scheffer, Emil,  
173 Shelby st., Louisville, Ky.
- Scheffer, Henry W.,  
Care of Larkin & Scheffer, St. Louis, Mo.
- Schellentrager, Ernst A.,  
725 St. Clair st., Cleveland, O.
- Scherer, Andrew,  
383 N. State st., Chicago, Ill.
- Scherff, John P.,  
Glenwood & Wash'tn aves., Bloomfield, N. J.
- Scherling, Gustav,  
1201 4th st., Sioux City, Ia.
- Schieffelin, William J.,  
170 William st., New York, N. Y.
- Schiemann, Edward B.,  
M & Walnut sts., Louisville, Ky.
- Schimpf, Henry W.,  
365 Franklin ave., Brooklyn, N. Y.
- Schlaepfer, Henry J.,  
Main & 2d sts., Evansville, Ind.
- Schley, Steiner,  
16 W. Patrick st., Frederick City, Md.
- Schlotterbeck, Augustus G.,  
501 Congress st., Portland, Me.
- Schlotterbeck, Julius O.,  
17 S. Ingalls st., Ann Arbor, Mich.
- Schmid, Henry,  
38 Ave. A., New York, N. Y.
- Schmidt, Carl,  
1871 Pearl st., Brooklyn Village, Cleveland, O.
- Schmidt, Ferdinand T.,  
86th st. & Amsterdam ave., New York, N. Y.
- Schmidt, Florian C.,  
7123 Cottage Grove ave., Chicago, Ill.
- Schmidt, Frederick M.,  
1107 Schiller Building, Chicago, Ill.
- Schmidt, Valentine,  
Polk & Jackson sts., San Francisco, Cal.
- Schmitt, George J. F.,  
507 W. Commerce st., San Antonio, Tex.
- Schmitt, Joseph M.,  
312 North st., Rochester, N. Y.
- Schmitter, Jonathan,  
Maple st., Gypsum City, Saline co., Kan.
- Schoenhut, Christie H.,  
199 Superior st., Cleveland, O.
- Schoettlin, Albert J.,  
4th & Chestnut sts., Louisville, Ky.
- Scholtz, Edmund L.,  
16th & Stout sts., Denver, Colo.

- Schrader, Herman v. R.,  
Tallahassee, Fla.
- Schrank, C. Henry,  
437 E. Water st., Milwaukee, Wis.
- Schroeder, John H.,  
Burnett ave. & Union st., Avondale, Cin., O.
- Schrouder, Benjamin,  
209 E. Bridge ave., Grand Rapids, Mich.
- Schueller, Ernst,  
281 S. High st., Columbus, O.
- Schueller, Frederick W.,  
232 S. High st., Columbus, O.
- Schuh, Paul G.,  
607 Commercial ave., Cairo, Ill.
- Schulze, Louis,  
631 S. Patterson Park ave., Baltimore, Md.
- Schurk, Louis,  
3201 Olive st., St. Louis, Mo.
- Schweickhardt, Richard,  
Main & Ervay sts., Dallas, Tex.
- Scott, Alex. W.,  
College ave., Fort Collins, Colo.
- Scott, George T.,  
Franklin Square, Worcester, Mass.
- Scott, J. McDonald,  
381 W. Van Buren st., Chicago, Ill.
- Scott, William H.,  
1617 17th st., Richmond, Va.
- Scoville, Charles H.,  
Opp. the Lock, Tonowanda, Erie co., N. Y.
- Scoville, Wilbur L.,  
St. Botolph & Garrison sts., Boston, Mass.
- SEABURY, GEORGE J.,  
59 Maiden Lane, New York, N. Y.
- Searby, William M.,  
400 Sutter st., San Francisco, Cal.
- Sedberry, Bond E.,  
Market Square, Fayetteville, N. C.
- Seifert, Charles A.,  
German Hospital, San Francisco, Cal.
- Selzer, Eugene K.,  
1492 Superior st., Cleveland, O.
- Sempill, Walter M.,  
135 Clark st., Chicago, Ill.
- Sennewald, Ferdinand W.,  
800 Hickory st., St. Louis, Mo.
- Serodino, Herman,  
53 Observatory st., Cincinnati, O.
- Sevin, N. Douglas,  
141 Main st., Norwich, Conn.
- Shafer, Erwin C.,  
Green Lane & York Road, Philadelphia, Pa.
- Shake, Homer C.,  
125 Oliver ave., W. Indianapolis, Ind.
- Shannon, Thomas R.,  
143 Trumbull st., Hartford, Conn.
- Sharp, Alpheus P.,  
Pratt & Howard sts., Baltimore, Md.
- Sharp, Harry,  
Junc. Marietta & Walton sts., Atlanta, Ga.
- Sharples, Stephen P.,  
13 Broad st., Boston, Mass.
- Shaw, Robert J.,  
3 E. Front st., Plainfield, N. J.
- Shelton, Wm. A.,  
Kansas & Howel av's, Marceline, Linn co., Mo.
- SHEPPARD, SAMUEL A. D.,  
1129 Washington st., Boston, Mass.
- Sherman, Charles R.,  
1513 Dodge st., Omaha, Neb.
- Sherrard, Charles C.,  
121 20th st., Detroit, Mich.
- Sherwin, Eugene A.,  
Ashland, Ore.
- Sherwood, Henry J.,  
979 Woodland ave., Cleveland, O.
- Sherwood, Lewis W.,  
45 W. Broad st., Columbus, O.
- SHINN, JAMES T.,  
Broad & Spruce sts., Philadelphia, Pa.
- Shoemaker, Richard M.,  
4th & Race sts., Philadelphia, Pa.
- Shreve, John A.,  
Main st., Port Gibson, Miss.
- Shryer, Thomas W.,  
111 Baltimore st., Cumberland, Md.
- Shumpik, Edward,  
1921 N. Washington ave., Minneapolis, Minn.
- Shurtleff, Israel H.,  
39 Elm st., New Bedford, Mass.
- Siegemund, Charles A.,  
84 Crawford st., Roxbury, Mass.
- Siegenthaler, Harvey N.,  
22 E. High st., Springfield, O.
- Sieker, Ferdinand A.,  
128 William st., New York, N. Y.
- Siekman, Ivan F.,  
75 S. Rampart st., New Orleans, La.
- Simmon, Karl,  
7th & Sibley sts., St. Paul, Minn.
- SIMMS, GILES G. C.,  
1344 New York ave., Washington, D. C.
- Simon, William,  
1348 Block st., Baltimore, Md.

- Simonson, William,  
     9th & Race sts., Cincinnati, O.  
 Simpson, William,  
     101 Fayetteville st., Raleigh, N. C.  
 Simpson, William C.,  
     Vienna, Ill.  
 Simson, Francis C.,  
     Pentagon Bdg., Halifax, N. S.  
 Simson, William A.,  
     Care Simson Bros. & Co., Halifax, N. S.  
 Skelly, James J.,  
     339 E. 14th st., New York, N. Y.  
 Skinner, William H.,  
     Pocahontas, Ark.  
 Slack, Henry R., Jr.,  
     East side Public Square, La Grange, Ga.  
 Slater, Frank H.,  
     P. O. Box 10, Matawan, Monmouth co., N. J.  
 SLOAN, GEORGE W.,  
     22 W. Washington st., Indianapolis, Ind.  
 Slocum, Frank L.,  
     170 Rebecca st., Allegheny, Pa.  
 Smink, Robert W.,  
     309 W. Spruce st., Shamokin, Pa.  
 Smink, William H. R.,  
     33 Market st., Shamokin, Pa.  
 Smith, B. Frank,  
     252 E. 60th st., New York, N. Y.  
 Smith, Charles B.,  
     861 Broad st., Newark, N. J.  
 Smith, Clarence P.,  
     861 Broad st., Newark, N. J.  
 Smith, Edward N.,  
     93 Main st., Thompsonville, Conn.  
 Smith, Edward S.,  
     Main st., Port Henry, N. Y.  
 Smith, Frank R.,  
     5th & King sts., Wilmington, Del.  
 Smith, Frank T.,  
     Franklin, Macon co., N. C.  
 Smith, James P.,  
     1776 Broad st., Augusta, Ga.  
 Smith, Joseph S.,  
     Akron, O.  
 Smith, Lauriston S.,  
     King st., St. Augustine, Fla.  
 Smith, Linton,  
     Church & Bennett sts., Wilmington, Del.  
 Smith, Linville H.,  
     701 Centre st., Jamaica Plain, Mass.  
 Smith, Reuben R.,  
     198 9th ave., New York, N. Y.  
 Smith, Samuel W.,  
     182 Main st., Ansonia, New Haven co., Conn.  
 Smith, Theodric,  
     1343 Pennsylvania ave., Baltimore, Md.  
 Smith, Thomas E.,  
     252 Beauregard st., Mobile, Ala.  
 Smith, Whitefoord G.,  
     31 Patton ave., Asheville, N. C.  
 Smith, Willard A.,  
     Main st., Richfield Springs, N. Y.  
 Smith, William C.,  
     Stockton, Cal.  
 Smithson, David E.,  
     Caldwell, Canyon co., Idaho.  
 Sniteman, Charles C.,  
     Neillsville, Clark co., Wis.  
 Snow, Charles W.,  
     214 Warren st., Syracuse, N. Y.  
 Snyder, Alva L.,  
     33 Court Square, Bryan, O.  
 Snyder, Ambrose C.,  
     13 $\frac{1}{2}$  St. Felix st., Brooklyn, N. Y.  
 Snyder, Robert J.,  
     2d & Market sts., Louisville, Ky.  
 Soetje, Edward C.,  
     434 South Broadway, South Denver, Colo.  
 Sohrbeck, G. Henry,  
     3d ave. and 16th st., Moline, Ill.  
 Solomons, Isaiah A.,  
     163 Congress st., Savannah, Ga.  
 Sombart, John E.,  
     El Reno, Oklahoma.  
 Sords, Thomas V.,  
     315 Pearl st., Cleveland, O.  
 Spalding, Warren A.,  
     89 Church st., New Haven, Conn.  
 Sparks, James M.,  
     718 Garrison ave., Fort Smith, Ark.  
 Spengler, John G.,  
     2d & Webster sts., Dayton, O.  
 Sperry, Herman J.,  
     633 Chapel st., New Haven, Conn.  
 Sprague, Weason G.,  
     Main st., Flushing, Mich.  
 Squibb, Edward H.,  
     36 Doughty st., Brooklyn, N. Y.  
 SQUIBB, EDWARD R.,  
     36 Doughty st., Brooklyn, N. Y.  
 STACEY, BENJAMIN F.,  
     Thompson Square, Charlestown, Mass.  
 Staebler, Richard,  
     848 Broad st., Newark, N. J.

- Stahler, William,  
     Main & Swede sts., Norristown, Pa.  
 Stahlbuth, Ernst H. W.,  
     5th & Washington sts., Columbus, Ind.  
 Stam, Colin F.,  
     Chestertown, Kent co., Md.  
 Stamford, William H.,  
     256 Mulberry st., Newark, N. J.  
 Stamm, Dante M.,  
     Geneseo, Ill.  
 Stark, Harry H.,  
     2108 Lucas Pl., St. Louis, Mo.  
 Starz, Emil A.,  
     204 Rodney st., Helena, Mont.  
 Staudt, Louis C.,  
     15 S. Broadway, Aurora, Ill.  
 Stearns, Henry A.,  
     Care of Fred. Stearns & Co., Detroit, Mich.  
 Stebbins, Harry F.,  
     Wilton & 23d sts., Denver, Colo.  
 Stecher, Henry W.,  
     1c66 Pearl st., Cleveland, O.  
 Stedhem, Frederick W. E.,  
     Broad st. & Fairmount av., Philadelphia, Pa.  
 Steele, George R.,  
     Main & Prospect sts., Thompsonville, Conn.  
 Steele, James G.,  
     635 Market st., San Francisco, Cal.  
 Steinhauer, Frederick,  
     1553 Larimer st., Denver, Colo.  
 Steinmetz, Frank J.,  
     Opp. Post Office, Carson City, Nev.  
 Stendel, Guthardt,  
     640 Dryades st., New Orleans, La.  
 Stevens, Alonzo B.,  
     13 Oakland ave., Ann Arbor, Mich.  
 Stevens, Fred. D.,  
     133 Woodward ave., Detroit, Mich.  
 Stewart, Andrew M.,  
     910 Pacific ave., Tacoma, Wash.  
 Stewart, Francis E.,  
     1c6 Charlotte ave., Detroit, Mich.  
 Stiles, Justin E.,  
     Wells, Minn.  
 Stoehr, Julius J.,  
     King st., Garrett, Ind.  
 Stong, Franz Sigel,  
     224 Montgomery ave., Chattanooga, Tenn.  
 Stoughton, Dwight G.,  
     204 State st., Hartford, Conn.  
 Stowell, Daniel,  
     1045 Washington st., Boston, Mass.
- Stuver, Emanuel,  
     Rawlins, Wyo.  
 Sumner, Alphonso,  
     51 Huntington ave., Boston, Mass.  
*Sweeney, Robert O.,*  
     Duluth, St. Louis co., Minn.  
 Sweet, Caldwell,  
     22 W. Market Square, Bangor, Me.  
 Symonds, Arthur H.,  
     Conneaut, Ashtabula co., O.  
 Tailby, Joseph A.,  
     Linden st., Wellesley, Mass.  
 Tammen, Geo.,  
     110 W. 3d st., Yankton, S. Dak.  
*Taylor, Alfred B.,*  
     2338 N. 6th st., Philadelphia, Pa.  
 Taylor, George E.,  
     615 Harrison ave., Leadville, Colo.  
 Taylor, Walter T.,  
     709 Dauphin st., New Orleans, La.  
 Thames, Joseph J.,  
     E. Main st., Taylor, Williamson co., Tex.  
 Thatcher, Hervey D.,  
     12 Market Square, Potsdam, N. Y.  
 Thieman, John H., Jr.,  
     1600 W. Broadway, Louisville, Ky.  
 Thomas, James,  
     428 Union st., Nashville, Tenn.  
 Thomas, Oscar E.,  
     164 Main st., Columbia, S. C.  
 Thomas, Robert, Jr.,  
     126 Broadway, Thomasville, Ga.  
 Thomasson, Anders,  
     277 Central st., Lowell, Mass.  
 Thompson, Albert D.,  
     101 S. Washington ave., Minneapolis, Minn.  
 Thompson, Frank A.,  
     559 3d ave., Detroit, Mich.  
*Thompson, William B.,*  
     4804 Trinity Place, W. Philadelphia, Pa.  
 Thompson, William S.,  
     703 15th st., Washington, D. C.  
 Thomsen, John J.,  
     16 W. German st., Baltimore, Md.  
 Thorn, Henry P.,  
     Main st., Medford, N. J.  
 Thurston, Azor,  
     Grand Rapids, Wood co., O.  
 Tigner, James O.,  
     Greenville, Meriwether co., Ga.  
 Tilden, Amos K.,  
     31 School st., Boston, Mass.

- Tobey, Charles W.,  
302 Market st., Troy, O.
- Tobin, John M.,  
Narragansett Pier, R. I.
- Todd, Albert M.,  
204 N. Rose st., Kalamazoo, Mich.
- Tomfohrde, Charles W.,  
1527 Case ave., St. Louis, Mo.
- Tomlinson, Burton A.,  
Care of McPike & Fox, Atchison, Kan.
- Topley, James,  
166 Georgia st., Vallejo, Solano co., Cal.
- Torbert, Willard H.,  
756 Main st., Dubuque, Ia.
- Townsend, James V.,  
13 S. Penna. ave., Atlantic City, N. J.
- Tracy, David W.,  
139 Main st., Hartford, Conn.
- Trautmann, Ludwig,  
Wabasha, Minn.
- Travis, Miles B.,  
Saybrook, McLean co., Ill.
- Treat, Joseph A.,  
Stuart, Guthrie co., Ia.
- Treherne, John C.,  
189 Hernando st., Memphis, Tenn.
- Tremble, John E.,  
2480 St. Catharine st., Montreal, Can.
- Trevitt, Cleophas A.,  
331 Broad st., Rome, Ga.
- Trimble, Henry,  
145 N. 10th st., Philadelphia, Pa.
- Troxler, Constantine, Jr.,  
228 Breckenridge st., Louisville, Ky.
- Truax, Charles,  
81 Randolph st., Chicago, Ill.
- Tschepppe, Adolph,  
64th st. & Park ave., New York, N. Y.
- Tucker, Greenleaf R.,  
City Hospital, Boston, Mass.
- Tucker, Mosely F.,  
Dauphin & Hamilton sts., Mobile, Ala.
- TUFTS, CHARLES A.,  
85 Washington st., Dover, N. H.
- Tuma, Bruno,  
11 Camp st., New Orleans, La.
- Turner, George H.,  
296 S. Pearl st., Albany, N. Y.
- Turner, John P.,  
1002 Broad st., Columbus, Ga.
- Turner, T. Larkin,  
North Weymouth, Mass.
- Turrell, Judson W.,  
Longmont, Colo.
- Uhlich, Ferdinand G.,  
2001 Salisbury st., St. Louis, Mo.
- Urban, Jacob P.,  
60 Ontario st., Cleveland, O.
- Valliant, George E.,  
720 Main st., Pine Bluff, Ark.
- Van Antwerp, Andrew,  
Dauphin & Royal sts., Mobile, Ala.
- Van Antwerp, Garet,  
71 Dauphin st., Mobile, Ala.
- Van Auken, Jerrie A.,  
17 N. Main st., Gloversville, N. Y.
- Van Winkle, Abraham W.,  
35 Clinton ave., Newark, N. J.
- Vance, James W.,  
S. E. cor. Square, Rockwall, Tex.
- Vargas-Heredia, Jorge,  
474 Columbus ave., Boston, Mass.
- Varney, Edward F.,  
39 Tremont st., Boston, Mass.
- Vaughan, Parry W.,  
Main st., Durham, Orange co., N. C.
- Vellines, Davies,  
700 N. Fulton ave., Baltimore, Md.
- Vernor, James,  
33 Woodward ave., Detroit, Mich.
- Viallon, Paul L.,  
Park & Front sts., Bayou Goula, La.
- Vickers, Rufus W.,  
Murfreesboro, Tenn.
- Vilter, Hermann T.,  
76 McMicken ave., Cincinnati, O.
- Vitt, Rudolph S.,  
3860 S. Broadway, St. Louis, Mo.
- Vockroth, Emil,  
79 Newark ave., Jersey City, N. J.
- Voge, Richard,  
260 S. Halstead st., Chicago, Ill.
- Voigt, Joseph F.,  
840 Market st., Chattanooga, Tenn.
- Vonachen, Frank H.,  
622 N. Adams st., Peoria, Ill.
- Vordick, August H.,  
Jefferson ave. & Benton st., St. Louis, Mo.
- Voss, George W.,  
680 Woodland ave., Cleveland, O.
- Votteler, William,  
Shelby & Oak sts., Louisville, Ky.
- Wagner, Henry,  
9th & Linn sts., Cincinnati, O.

- Wagner, William I.,  
Jackson, Ga.
- Walbrach, Arthur,  
1414 15th st., Denver, Colo.
- Walker, David,  
601 S. W. Boulevard. Kansas City, Mo.
- Walker, John P.,  
Main st., Freehold, N. J.
- Walker, William J.,  
74 State st., Albany, N. Y.
- Wall, Otto A.,  
4500 S. Compton ave., St. Louis, Mo.
- Wangler, Conrad D.,  
227 E. 4th st., Waterloo, Ia.
- Ward, A. Jac,  
8 S. Tejon st., Colorado Springs, Colo.
- Ward, Charles A.,  
P. O. Box 460, Stoneham, Mass.
- Ward, Charles E.,  
790 Broadway, Denver, Colo.
- Ward, George J.,  
Front st., St. Clair City, Mich.
- Ward, Milo W.,  
212 2d st., Des Moines, Ia.
- Wardell, Robert C.,*  
Residence Unknown.
- Warn, William E.,  
1st st., Keyport, N. J.
- Warner, William R.,*  
1228 Market st., Philadelphia, Pa.
- Warren, Edwin A.,  
400 Sibley st., St. Paul, Minn.
- Warren, William M.,  
154 Lafayette ave., Detroit, Mich.
- Washburn, Harry M.,  
823 Kansas ave., Topeka, Kan.
- Watson, Herbert K.,  
803 Market st., Wilmington, Del.
- Watson, Sidney P.,  
137 Richardson st., Atlanta, Ga.
- Watt, George H.,  
Pullman, Wash.
- Watters, Henry,  
Sparks & Bank sts., Ottawa, Can.
- Waugh, George J.,  
Ontario st, Stratford, Ont., Can.
- Way, David,  
Waynesville, N. C.
- Way, Frank Lester,  
24 S. Main st., Manchester, N. H.
- Wearn, William H.,  
Trade & Tryon sts., Charlotte, N. C.
- Webb, David C.,  
Forrest City, Ark.
- Webb, William H.,  
556 N. 16th st., Philadelphia, Pa.
- Webber, J. Le Roy,  
Care Clinton Pharm. Co., Syracuse, N. Y.
- Webster, H. Gordon,  
15 Washington ave. W., Minneapolis, Minn.
- Weeks, B. Frank,  
Room 32 Johnston Bld., Cincinnati, O.
- Wehrly, Thomas M.,  
3d & H sts. N. E., Washington, D. C.
- Weida, Charles A.,  
224 N. 5th st., Reading, Pa.
- Weidemann, Charles A.,  
2148 Green st., Philadelphia, Pa.
- Weihe, Otto A.,  
640 Post st., San Francisco, Cal.
- Weinman, Oscar C.,  
173 7th ave., New York, N. Y.
- Weiser, William A.,  
Lock Box 169, Bourbon, Ind.
- WELLCOME, HENRY S.,  
8 Snow Hill, London, England.
- Wells, Charles H.,  
601 N. Main st., Pueblo, Colo.
- Wells, Edwin H.,  
43 Hanover st., Boston, Mass.
- Wendell, Henry E.,  
3d & George sts., Philadelphia, Pa.
- Wenzell, William T.,  
113 Fulton st., San Francisco, Cal.
- Werner, Benj. C.,  
Black River Falls, Jackson co., Wis.
- Werner, Rudolf C.,  
2592 Atlantic ave., Brooklyn, N. Y.
- Wescott, William C.,  
Pacific and Delaware aves., Atlantic City, N. J.
- West, Charles A.,  
99 Broad st., Boston, Mass.
- Westcott, James W.,  
423 N. Charles st., Baltimore, Md.
- Westlake, Leonard J.,  
194 Main st., Gold Hill, Nev.
- Westmann, Frank H.,  
2744 Cass ave., St. Louis, Mo.
- Wetherell, Albert S.,  
122 Water st., Exeter, N. H.
- Wetterstroem, Albert,  
435 Colerain ave., Cincinnati, O.
- Weyer, John,  
Norwood, Hamilton co., O.

- Whall, Joseph S.,  
     82 Hancock st., Quincy, Mass.  
 Wheeler, C. Gilbert,  
     143 Lake st., Chicago, Ill.  
 Wheeler, William D.,  
     21 Massachusetts ave., Boston, Mass.  
 Whelpley, Henry M.,  
     2342 Albion Place, St. Louis, Mo.  
 Whitcomb, Frederick E.,  
     Broadway & Olive st., St. Louis, Mo.  
 WHITE, AARON S.,  
     59 High st., Mt. Holly, N. J.  
 White, George H.,  
     Newark & Jersey aves., Jersey City, N. J.  
 White, Richard E.,  
     400 Hayes st., San Francisco, Cal.  
 White, William H.,  
     2320 4th st., Meridian, Miss.  
 WHITFIELD, THOMAS,  
     240 Wabash ave., Chicago, Ill.  
 Whiting, J. Fred.,  
     Main st., Great Barrington, Mass.  
 Whitman, Nelson S.,  
     175 Main st., Nashua, N. H.  
 WHITNEY, HENRY M.,  
     297 Essex st., Lawrence, Mass.  
 Wichelns, Frederick,  
     192 Greenwich st., New York, N. Y.  
 Wickham, William H.,  
     91 Fulton st., New York, N. Y.  
*Wiegand, Thomas S.,*  
     145 N. 10th st., Philadelphia, Pa.  
 Wienges, Conrad,  
     473 Jersey ave., Jersey City, N. J.  
 Wilbur, Lot,  
     Ave. C & 1st st., Snohomish, Wash.  
 Wilcox, Frederick,  
     Apothecaries' Hall, Waterbury, Conn.  
 Wilder, George P.,  
     N. Park st., Lebanon, N. H.  
 Wilhite, Frank T.,  
     39 Public Square, Anderson, S. C.  
 Williams, Charles F.,  
     Main st., Thomaston, Conn.  
 Williams, Duane B.,  
     16 Lincoln Square, Worcester, Mass.  
 Williams, George G.,  
     P. O. Box 3551, Boston, Mass.  
 Williams, John K.,  
     391 Main st., Hartford, Conn.  
 Williams, Richard W.,  
     Notre Dame st., Three Rivers, Quebec, Can.  
 Williams, Seward W.,  
     8 Brighton ave., East Orange, N. J.  
 Williams, William H.,  
     659 Main st., Wheeling, W. Va.  
 Wills, Fred. M.,  
     323 Main st., Charlottesville, Va.  
 WILSON, BENJAMIN O.,  
     28 Merchants' Row, Boston, Mass.  
 Wilson, Charles F.,  
     11th & Auburn sts., St. Louis, Mo.  
 Wilson, Frank M.,  
     133 Main st., Willimantic, Conn.  
 Wilson, John E.,  
     Front st., Walnut Ridge, Lawrence co., Ark.  
 Wilson, William,  
     86 Broadway, New York, N. Y.  
 Wingate, Frank H.,  
     Sanford, York co., Me.  
 WINKELMANN, JOHN H.,  
     31 Hopkins Place, Baltimore, Md.  
 Winnberg, John M.,  
     200 Main st., Jamestown, N. Y.  
 WINTER, JONAS,  
     202 Prospect st., Hagerstown, Md.  
 Winters, Aaron,  
     75 N. Second st., Ironton, O.  
 Wittmer, Joseph W., Jr.,  
     527 Clay st., Dubuque, Ia.  
 WOLTERSORDF, LOUIS,  
     171 Blue Island ave., Chicago, Ill.  
 Wood, Alonzo F., Jr.,  
     2 Church st., New Haven, Conn.  
 Wood, Edward S.,  
     688 Boylston st., Boston, Mass.  
 Wood, George M.,  
     2c Broad st., Bloomfield, N. J.  
 Wood, James P.,  
     2 Church st., New Haven, Conn.  
 Wood, Mason B.,  
     P. O. Box 58, East Providence, R. I.  
 Woodman, Walter I.,  
     St. Augustine, Fla.  
 Woodruff, Roderick S.,  
     92 Prospect st., Waterbury, Conn.  
 Woods, George D.,  
     Residence Unknown.  
 Woodward, Brinton W.,  
     Lawrence, Kan.  
 Wooldridge, Daniel T.,  
     9 Morgan st., Boonville, Mo.  
 Woolley, Stephen D.,  
     Asbury Park, N. J.

Wooten, Thomas V., 943 W. Madison st., Chicago, Ill.	Youngs, William, 114 Park ave., Rich Hill, Mo.
Wray, George B., P. O. Box 721, Yonkers, N. Y.	Zahn, Emil A., 1801 State st., Chicago, Ill.
Wright, Arthur W., 44 New st., Newark, N. J.	Zellhoefer, George, 1044 Broadway, Brooklyn, N. Y.
Wulling, Frederick J., Minn. University, Minneapolis, Minn.	Ziegler, Philip M., 526 Penn st., Reading, Pa.
Wunderlich, Edward, 1415 Dryades st., New Orleans, La.	Zimmer, Harry E., 78 E. Washington, st., Indianapolis, Ind.
Wurmb, Theodore H., 1923 E. Grand ave., St. Louis, Mo.	Zimmermann, Albert, 2113 S. Adams st., Peoria, Ill.
Wykoff, Elmer E., 2409 7th ave., Rock Island, Ill.	Zimmermann, Bernard, 45 E. 4th st., St. Paul, Minn.
Yearby, William M., 123 E. Main st., Durham, N. C.	Zimmermann, Charles, 105 2d ave., Peoria, Ill.
YORSTON, MATTHEW M., 429 Central ave., Cincinnati, O.	Zoeller, Edward V., Main st., Tarboro, N. C.
Young, Hiram W., Main st., Marion, Kans.	Zuenkeler, J. Ferd., 686 Vine st., Cincinnati, O.
Young, John K., P. O. Box 235, Bristol, Pa.	Zwick, George A., 11th st. & Madison ave., Covington, Ky.

## LIST OF RESIGNATIONS.

Andrews, Josiah H.	Haight, William B.	Pursell, Howard.
Clarke, Louis G.	Hancock, Chas. W.	Read, Albert M.
Cowdin, George H.	Hollister, Albert H.	Royster, Oliver M.
Currier, Edward H.	Hutchins, Isaiah.	Russell, Dorian M.
Eckel, Augustus W.	Lawton, Charles H.	Sargent, Jesse W.
Eichberg, Julius H.	Lawton, Horace A.	Sautter, Louis.
Emerson, Hermann L.	McComas, Percy G.	Schwab, Leslie W.
Fowler, Joseph W.	Netz, Richard H. G.	Squires, G. Benton.
Gates, Howard E.	Page, David S.	Stein, Jacob H.
Gering, Henry R.	Pattison, Chas. H.	Tiarks, Hermann.
Gibson, Chas.	Phelps, Dwight.	Townsend, Albert D.
Haggarty, Mary.	Probeck, George J.	

## LIST OF DECEASED MEMBERS.

<i>Ash, Matthew F.,</i>	Jackson, Miss.,	Elected 1856
Blackman, Augustus,	New York, N. Y.,	" 1893
Blestren, Hans M. G.,	Eau Claire, Wis.,	" 1889
<i>Bower, Henry,</i>	Philadelphia, Pa.,	" 1860
Christie, James,	New York, N. Y.,	" 1893
Curtman, Chas. O.,	Saint Louis, Mo.,	" 1871



CUTLER, E. WALDO,	Boston, Mass.,	Elected 1859
Farlow, John B.,	Salt Lake City, Utah,	" 1889
<i>Gallagher, Chas. K.,</i>	Washington, N. C.,	" 1857
Habliston, Chas. C.,	Baltimore, Md.,	" 1894
Hall, Charles K.,	New Orleans, La.,	" 1887
Hamilton, Claude C.	Kansas City, Mo.,	" 1893
<i>Hay, Henry H.,</i>	Portland, Me.,	" 1867
Hegeman, J. Niven,	New York, N. Y.,	" 1880
Higgins, James S.,	New York, N. Y.,	" 1862
Hohley, Charles,	Toledo, O.,	" 1872
Holzhauser, Gustavus,	Newport, Ky.,	" 1893
Ihlefeld, Conrad S.,	New York, N. Y.,	" 1881
Jennings, N. Hynson,	Baltimore, Md.,	" 1857
Lalmant, Eugene,	New Orleans, La.,	" 1891
Last, Louis,	Moberly, Mo.,	" 1888
Lyman, Asahel H.,	Manistee, Mich.,	" 1884
Markoe, Geo. F. H.,	Boston, Mass.,	" 1863
Mason, Alfred H.,	New York, N. Y.,	" 1884
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Taylor, John P.,	New Bedford, Mass.,	" 1875
ZEILIN, J. HENRY,	Philadelphia, Pa.,	" 1859

LIST OF MEMBERS DROPPED FROM THE ROLL FOR NON-  
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Hunt, Denis D.  
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McMichael, Americus O.  
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Morwessel, Henry.  
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Smith, George S.  
Sohn, Frank.  
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Strathman, Chas. A.  
Summers, Jas. W. F.  
Taylor, Geo. A.  
Troppmann, Chas. M.  
Tyner, Chas. O.  
Upson, Rosa.  
Walker, Joel P.  
Weber, Hermann A.  
Weber, John H.  
Wheat, Eli M.  
Willett, G. Howard.  
Williams, Edw. M.  
Winters, John H.  
Woods, Silas E.

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